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

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SECTION A. General description of project activity

A.1 Title of the project activity:

>>
Monjolinho Energética S.A.'s CDM Project.

PDD Version number: 3.

Date: October 27th, 2009.

A.2. Description of the project activity:

The project activity consists on the supply of clean hydroelectric energy to the Brazilian National Interconnected System (SIN) through the implantation and operation of Hydro Power Plant (HPP) Monjolinho (Alzir dos Santos Antunes), located in the state of Rio Grande do Sul, Southern Region of Brazil, using a small reservoir, with low environmental impact.

The Monjolinho Energética S.A.'s CDM Project is being re-submitted for validation. The project was submitted for validation in the first time Through the DOE Bureau Veritas Certification Holding S.A in 11th April to 10th May 2008 (Stakeholders Comments). After the validation by Bureau Veritas Certification Holding S.A, the project was approved by Brazilian DNA and it received the Letter of Approval in 9th December 2008. Project Proponents requested the project registration in 08th January 2009. The Board opinion expressed in the EB 48th Meeting (17th July 2009) that: "Monjolinho Energética S.A.'s CDM Project" (2362) submitted for registration by the DOE (BVC) could not be registered because the PDD submitted for validation and the project design have undergone major changes without the DOE issuing Corrective Action Requests, and therefore a recommencement of the validation is required.". This opinion was related mainly to the changes occurred in the installed capacity between the first version of the PDD put for validation and the PDD submitted for registration.

Project Participants decided to follow the Board recommendation and they updated the PDD and they recommenced the validation process. When updating the PDD with the project information, it was also necessary to review the methodologies and guidelines of the CDM.

The main objective of the Hydro Power Plant Monjolinho (Alzir dos Santos Antunes) is to help attend the growing demand for energy in Brazil, due to the country's economical and population growth, supplying clean and renewable energy, contributing, thus, to the environmental, social and economical sustainability, by increasing the participation of clean and renewable energy in relation to the country's total consumption of electricity.

The baseline scenario is the same as the scenario existing prior to the start of implementation of the project activity because the electricity that will be delivered to the grid by the project would have been generated otherwise by the operation of a grid-connected power plant and by the addition of new generating sources, as reflected in the combined margin described in the Tool to calculate the emission factor for an electricity system.

The project activity reduces the emissions of green house gases (GHG), avoiding the generation of electricity through sources of fossil fuels with consequent CO_2 emissions, which would be produced if the project did not exist. In the absence of the Project, the presence of thermoelectric plants in the National Interconnected System would cause emission of GHGs. The supply of clean and renewable electricity will bring and important contribution to environmental sustainability, reducing the emissions of carbon dioxide taking place in the absence of this project.

Monjolinho Energética S.A. – MONEL – is a special purpose company, constituted to build and operate the Monjolinho hydroelectric plant as its exclusive owner. According to the first additive term in the contract celebrated along with ANEEL (National Agency of Electrical Energy), the implantation schedule of the HPP Monjolinho (Alzir dos Santos Antunes) is described below:

Table 1 – HPP Monjolinho (Alzir dos Santos Antunes)'s Physical Schedule Approved by ANEEL

Activity	Deadline (dd/mm/yyyy)
Beginning of the powerhouse's concretion	01/06/2008
Descent of the 1st turbine's rotor	01/04/2009
Beginning of the 1st hydrogenerator unit's commissioning	01/09/2009
1st hydrogenerator unit's commercial operation start	01/11/2009
Descent of the 2nd turbine's rotor	01/06/2009
Beginning of the 2nd hydrogenerator unit's commissioning	01/11/2009
2nd hydrogenerator unit's commercial operation start	31/12/2009

Although the first hydro generator unit commercial operation start is expected to happen on November 1st, 2009, Monjolinho Energética S.A. worked with the goal of anticipating the commercial generation to July/2009 and, for that, it has been developing an acceleration program for the construction plan. This acceleration program worked well and the plant started its operation test phase in July/2009.

Monjolinho Energética S.A – MONEL has as unique shareholder the company Desenvix S.A. Desenvix S.A. is a subsidiary of Engevix Engenharia S.A., created in 1995 to develop new businesses, especially in the area of electric energy generation in three states of Brazil - Rio Grande do Sul, Santa Catarina and Rio de Janeiro – through its controlled companies. Desenvix S.A has participation, besides Monjolinho Energética S.A, in others energy generation entrepreneurships, which totalize 154.85 MW of installed capacity: Dona Francisca Energética (2.65 MW); CERAN (18 MW); Esmeralda S.A (22.20 MW); Santa Laura S.A. (15 MW) and Santa Rosa (installed capacity of 30 MW).

Desenvix S.A. is controlled by Engevix Engenharia S.A, which holds 100% of the social capital and its directors are the same shareholders of the controller company. The history of Desenvix S.A., despite recent, reflects more than four decades of development and growth of its controller company.

Engevix is a Brazilian company, specialized in the services of advisory engineering, responsible for the elaboration of project, integration and management of entrepreneurships in the area of energy, industry and infrastructure. It has more than 42 years of history and has a strong action in and outside Brazil in the sector of hydraulic, thermal and nuclear and through alternative sources of energy generation; transmission and distribution of energy, construction on urban transportation and sanitation, among others sectors. Engevix operates with 1,4 thousand collaborators and has offices in Brazil in the cities of Florianopolis, São Paulo, Rio de Janeiro, Brasília and Curitiba, as well as abroad, in countries such as Angola and Mexico.

Proof of its capacity of realization are the participation in huge projects as the hydroelectric plants of Itaipu, Tucuruí, Capivara, Volta Grande, Salto Caxias, Canoas I and II; Nuclear Plant Angra II; Metropolitan trains in São Paulo, Rio de Janeiro, Belo Horizonte and Porto Alegre, Subways in São Paulo, Baghdad and Rio de Janeiro; Expansion projects of the steel companies COSIPA, Usiminas, Açominas and CST; Railway in Carajás; Alunorte factory in Barcarena; Airports in São Paulo and Rio de Janeiro (second phase); Bandeirantes, Ayrton Senna and Carvalho Pinto Highways.

A great part of the company's growth history is related to its performance in the energy sector and, this way, Desenvix S.A was created to make the participation of Engevix in energetic generation projects

possible. Acting as a holding, the company develops its activities through its controlled companies that exercise the function of independent producers of energy in the national electrical sector.

One of these controlled companies is Monjolinho Energética S.A. – MONEL, created specifically to implement and to operate Monjolinho Energética S.A.'s CDM Project (hereafter referred to as "Monjolinho Project"), which contributes to the sustainable development once contributing to the economic growth without compromising the future generations, respecting the concept of Sustainable Development, established by Brundtland Report, elaborated by the World Commission on Environment and Development, which defines the term "sustainable development" as "the development that satisfies the present necessities, without compromising the capacity of future generations of supplying their own necessities"[1]

Through the following actions, Monjolinho Project contributes to the sustainable development of its region and country:

(a) Through Monjolinho Project, clean and renewable energy will be dispatched to the Brazilian National Interconnected System, displacing possible entrepreneurships that would generate energy through the burning of fossil fuels, avoiding, thus, the emission of poluent gases to the atmosphere and preserving the environment to future generations.

(b) Through the generation of approximately 900 direct jobs, indirect jobs and through the boosting of economics activities aggregated to the entrepreneurship's implementation, Monjolinho Project promotes the region's economic development, which happens through the generation of income to the community of the municipalities involved and to its collaborators. Furthermore, through the taxes and tributes generated by its activities to the cities involved and to the Union, Monjolinho Project provides financial resources which will be reverted into benefits to the region's population and for the country as a whole.

(c) Besides Monjolinho project presents low environmental impacts, with the formation of a small reservoir and elevated power density, Monjolinho Energética S.A. makes considerable investments in environmental programs and actions. It will be developed 24 environmental programs on the physical, biotic and anthropic environment to mitigate possible project's environmental impacts. We can highlight the reforestation program, which predicts the planting of 250,000 small branches of native species along the ciliar zone and the specific programs of environmental education that will contribute to the awareness of the population in the municipalities involved in the entrepreneurships about environmental and ecological issues.

(d) Since the HPP Monjolinho (Alzir dos Santos Antunes) is located in the rural area of Rio Grande do Sul, the implantation of this kind of project in the region will demand the capacitating of the collaborators to be hired or sub-hired in the region and of the population itself in the municipalities involved. Through a environmental education program, activities along with the scholar community of the municipalities within the project's direct influence will be realized, besides activities to capacitate sub-hired companies, and educational activities with residents of the reservoir's surroundings. Moreover, Engevix S.A. has a human resources politics that aims at the qualification of all the collaborators of the companies in the group, applying also to the collaborators of the HPP Monjolinho (Alzir dos Santos Antunes). Through this action, Monjolinho Energética S.A seeks to capacitate its collaborators to the market and contribute to the growth of knowledge and to the level of education of the municipalities where it acts.

(e) Investments in culture and on social responsibility programs are part of the company's culture and will be also carried out in Monjolinho project. Through Engevix Institute, the group promotes social

[1] WCED [CMMAD], 1987. Our Commom Future [Nosso Futuro Comum]. The World Commission on Environment and Development [Comissão Mundial sobre Meio Ambiente e Desenvolvimento]. Oxford University Press.

investments mainly in the area of children education, through social-educative and professionalizing workshops. Furthermore, for over 25 years, Engevix S.A. develops programs to support culture, particularly in arts and music. Continuing the Engevix culture, investments on social-cultural project will also be developed in Monjolinho project, which has a BNDES', National Bank of Economic and Social Development, specific funding line, in amount of R$ 2 million, to invest in social programs that will be developed in the Entrepreneurship's implementation.

Through its performance in several sectors in society and through the investments in the energetic sector, Monjolinho Energetica S.A. seeks to continue contributing to the sustainable development of the cities where it acts, in the region and in the country as a whole.

A.3. Project participants:

Monjolinho Energética S.A. is the owner of Hydropower Plant Monjolinho (Alzir dos Santos Antunes) and it is responsible for all activities related to the plant`s implementation and operation.

Enerbio Consultoria Ltda advises Monjolinho Energética S.A. to develop CDM Project and to monitor the CERs to be generated from the Monjolinho Project.

Monjolinho Energética S.A. is the Project Focal Point. The table 2 below represents the parties and entities involved in the Monjolinho Project.

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

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: Monjolinho Energética S.A.	No
	Private Entity: Enerbio Consultoria Ltda	
(*) 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.		

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

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.:

Region: South of Brazil

State: Rio Grande do Sul.

A.4.1.3. City/Town/Community etc:

Municipalities of Faxinalzinho, Nonoai, Benjamin Constant do Sul and Entre Rios do Sul.

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

The powerhouse of HPP Monjolinho (Alzir dos Santos Antunes) is located on Passo Fundo River, sub-basin 71, Uruguai River Basin, in the municipalities of Faxinalzinho and Nonoai, State of Rio Grande do Sul, South Region of Brazil, on coordinates 27°20'44" South Latitude and 52°43'52 West Longitude.

Although it is located between the municipalities of Faxinalzinho and Nonoai, the project also presents impacts in the cities of Benjamin Constant do Sul and Entre Rios do Sul, because part of the HPP Monjolinho (Alzir dos Santos Antunes)' reservoir flooded area is located in these municipalities.

The table below shows some socio-economical indicators of the municipalities where the HPP Monjolinho (Alzir dos Santos Antunes) is located:

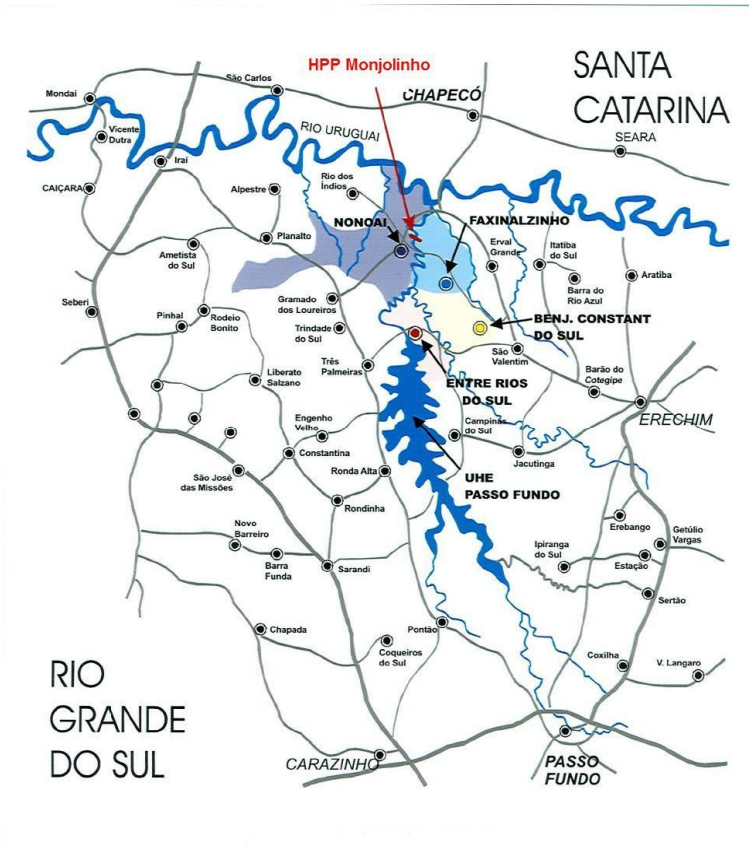
Table 3 – Socio-Economical indicators of municipalities where the HPP Monjolinho (Alzir dos Santos Antunes) is located

Municipality	Total Population (2006)	Area (km2)	Anual GDP per capita (2004)	Iliteracy Rate (2000)	Life expectancy (2000)
Faxinalzinho	2,795	143.4	R$ 5,446	12.63%	67.75 years
Nonoai	11,844	469.3	R$ 6,910	16.75%	67.45 years
Entre Rios do Sul	2,891	120.4	R$ 15,560	11.38%	67.75 years
Benjamin Constant do Sul	2,498	132.4	R$ 4,549	19.62%	64.09 years

*Data Source: Fundação de Economia e Estatística, organization linked to Secretaria do Planejamento e Gestão of Rio Grande do Sul State`s Government.
Available at: www.fee.rs.gov.br/sitefee/pt/content/resumo/pg_municipios.php

The map below shows the localization of HPP Monjolinho (Alzir dos Santos Antunes):

Map 1 – Localization of HPP Monjolinho (Alzir dos Santos Antunes)



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:

The HPP Monjolinho (Alzir dos Santos Antunes) will use the Passo Fundo River's hydraulic potential to generate electricity with an installed capacity of 74 MW. The HPP Monjolinho (Alzir dos Santos Antunes) is a run-of-river hydroelectric power plant with a small reservoir with 5.46 km^2.

The baseline scenario is the same as the scenario existing prior to the start of implementation of the project activity. As it will be further described in the section B.5 (step 4), there are, according ANEEL[2] the following number of electricity generation's entrepreneurships in operation in the n the South Region of Brazil (region where the Monjolinho Project is located):

- *87 - Hydro Power Plant Central Generation with Installed Capacity smaller than 1 MW;*
- *7 Wind Power Plant;*
- *87 Small Hydro Power Plant with Installed Capacity Greater than 1 MW and Smaller than 30 MW;*
- *38 Hydro Power Plant with Installed Capacity Greater than 30 MW;*
- *79 Thermal Power Plant.*

As it will be further described in the Common Practice Analysis, it is important to highlight that just 12[3] (twelve) hydropower plants above 30 MW were not built by state-owned entities in this region. It is also important to say that in Rio Grande do Sul, state where Monjolinho Project is located, there are only 5 hydropower plants above 30 MW that were not built by state-owned entities, proving that this kind of project activity is not a common practice in this state.

The Basic Project of HPP Monjolinho was approved in 22th May 2007. Initially, the installed capacity of HPP Monjolinho (Alzir dos Santos Antunes) was 67 MW. In 04/06/2008 (DD/MM/YYYY), ANEEL (National Agency of Electric Energy) approved an increase in the installed capacity of HPP Monjolinho (Alzir dos Santos Antunes). The new official installed capacity is 74 MW. It is important to say that the reservoir area to be flooded did not change to the area initial projected.

The marketable product of a hydro power plant in Brazil is the assured energy. Practically, the marketable energy is a little bit lower than the full assured energy because of the energy losses on the connection and transmission system besides the internal consumption . MONEL also required a review in the assured energy of 43.1 MW. The assured energy is formally calculated and established for commercial purposes by the regulators (ANEEL and MME, Ministry of Mines and Energy). MONEL does not have control over decisions about changes and it is not sure about possible changes in the assured energy. MONEL estimates an increase of 2 MW on the assured energy according the technical note made available by MME to explain how must be calculated the assured energy, but this a responsibility of MME. At June 2008 the investors asked to ANEEL and MME to recalculate an increased assured energy for the plant. So far, MONEL has not received any answer. Therefore, the official assured energy is 43.1 MW. In the sensitivity analysis, Project Participants will also consider the assured energy of 45.1 MW among others scenarios.

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[2] http://www.aneel.gov.br/area.cfm?idArea=15&idPerfil=2

[3] It was used the profile of the Brazilian Electrical Sector of the "Atlas of Electric Energy of Brazil , 3rd edition " , year 2008 (ISBN: 978-85-87491-10-7) elaborated by National Agency of Electric Energy in November 2008 – pages 159 to 233.

The table below presents the main technical parameters of HPP Monjolinho (Alzir dos Santos Antunes).

Table 4: Technical Characteristics of HPP Monjolinho (Alzir dos Santos Antunes)

1. DAM					
TYPE: Rockfill with Concrete Face			ROCKFILL:	1,284,589	m^3
LENGTH ALONG CREST:	420	m	FILTER AND TRANSITION	55,850	m^3
MAXIMUM HEIGHT:	74	m	CONCRETE (**CONVENTIONAL**):	11,632	m^3
ELEVATION OF CRESTA:	335	m	TOTAL VOLUME:	1,378,253	m^3
2. SPILLWAY					
TYPE: SURFACE WITH OVERFLOW CREST					
CAPACITY:	6,755	m^3/s			
LEVEL SURFACE:	328,50	m			
TOTAL LENGHT:	210	m			
NUMBER OF GATE:	1				
GATE'S WIDTH:	210	m			
COMMOM EXCAVATION:	96,755	m^3			
ROCK EXCAVATION ON OPEN SKY:	880,078	m^3			
CONCRETE (CONVENTIONAL):	6,955	m^3			
3. ADDUCTOR SYSTEM					
APPROACH CHANNEL			**WATER INTAKE**		
LENGHT:	155	m	TYPE:	GRAVITY	
COMMOM EXCAVATION	18,300	m^3	TOTAL LENGHT:	25	m
ROCK EXCAVATION ON OPEN SKY:	80,800	m^3	NUMBER OF GATE:	2	
			COMMOM EXCAVATION:	7,700	m^3
			ROCK EXCAVATION ON OPEN SKY:	27,200	m^3
			CONCRETE:	4,622	m^3
TUNNEL					
INTERNAL DIAMETER:	4.20/3.60	m	**FLOODGATES**		
			TYPE	WAGON	
MEDIUM LENGHT:	111	m	TO SET IN MOTION	HIDRAULIC	
CONCRETE:	2,596	m^3	GATE'S WIDTH	4.20	m
UNDERGROUND ROCK EXCAVATION::	6,890	m^3	GATE'S HEIGHT:	4.00	m
4. POWER HOUSE					
TYPE: SHELTERED			COMMOM EXCAVATION:	54,830	m^3
NUMBER OF GENERATORS UNITS:	2		ROCK EXCAVATION ON OPEN SKY:	107,840	m^3
WIDTH OF BLOCK OF UNIT	14	m	CONCRETE:	8,260	m^3
WIDTH OF MOUNTING AREA:	25	m			
WIDTH OF UNLOADING AREA:	8.15	m			
TOTAL LENGHT:	68.00	m			
5. TURBINES					

TYPE: FRANCIS			NOMINAL UNIT FLOW:	139	m^3/s
NOMINAL UNIT POWER:	37.75	MW	MAXIMUM PERFOMANCE:	95	%
SYNCHRONOUS ROTATION	257.14	rpm			
PROJECT GROSS FALL:	63.3	M			
6. GENERATORS					
NOMINAL UNIT POWER:	41.1	MVA	MAXIMUM PERFOMANCE:	98	%
SYNCHRONOUS ROTATION:	257.14	Rpm	CAPACITY FACTOR:	0.90	
NOMINAL TENSION:	13.8	kV			
7. ENERGETIC STUDIES					
MAXIMUM GROSS FALL:	65.3	m	ASSURED ENERGY	43.1	MW MEDIUM
NET FALL REFERENCE	61.0	m			
POWER PLANT CAPACITY:	74	MW			

There are four (4) meters of electricity located in the HPP. Two of them are located in each generator unit. They measure the Gross Electricity generated by each generator unit. The other two meters (one Principal and one Rearguard) are located in the substation "Passo Fundo". The meters located in the substation measure the net electricity supplied to the grid.

The equipments and technologies to be employed in the project were developed in Brazil and have already been successfully applied to similar projects in the country and in the world. The technology applied is well established in the sector, since Francis turbine is one of the most widely used in hydropower plants projects in the world. A national company will be responsible for the entrepreneurship's implantation, since a Engevix S.A.was hired by Monjolinho Energética S.A. to the entrepreneurship's complete execution through the EPC (Engineering, Procurement and Construction) modality, being responsible for the whole project elaboration, from feasibility study to construction, Electromechanical assembly, works on reservoirs and emergency action plans.

The CO_2 is the greenhouse gas involved in the project activity. The emissions of CO_2 from electricity generation in fossil fuel fired power plants are the emissions sources that are displaced due to the project activity.

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

Using the monthly baseline emission factor calculated as presented on the item B.6.1, the complete implementation of the Monjolinho Project, connected to the South Brazilian interconnected grid, will generate a yearly average estimated reduction of **114,484 tCO_{2e}** and a total reduction of **801,391 tCO_{2e}** during the first 7-year-period, described in the table below:

Table 5: Estimation of Monjolinho Project's emissions reduction

Year	Annual estimation of emission reductions (tCO_2e)e
2010	114,484
2011	114,484
2012	114,484
2013	114,484
2014	114,484
2015	114,484
2016	114,484
Total Estimated Reductions (tCO_2e)	**801,391**
Total Number of Crediting Years	**7**
Annual average over the crediting period of estimated reductions (tonnes of CO2e)	**114,484**

Notes:

- EGy and EGbaseline projections were made assuming power plant operation during 8,760 hour per year;
- The electricity generation is projected according to HPP Monjolinho (Alzir dos Santos Antunes)' s commercializable energy of 42 MW (Assured Energy less losses with transmission, connection and internal consumption);
- The projection assumed as the starting date of the first crediting period the date of registration on CDM EB, projected to be 1st January 2010.

A.4.5. Public funding of the project activity:

No public funding for the CDM's project activities was solicited by parties involved in Annex I.

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:

- Approved consolidated baseline and monitoring methodology ACM0002, version 10 – "Methodology Consolidated for grid-connected electricity generation from renewable sources."
- Tool for the Demonstration and Assessment of Additionality, Version 5.2.
- Tool to calculate the emission factor for an electricity system, version 2.

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:

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The ACM0002 consolidated methodology is applicable to grid-connected renewable power generation project activities that install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity.

- In case of hydro power plants, one of the following conditions must apply:
  - The project activity is implemented in an existing reservoir, with no change in the volume of reservoir;
  - The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emission section, is greater than 4 W/m^2.
  - The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m^2.

The ACM0002 methodology can be applicable to Monjolinho Project due to the following aspects:

- HPP Monjolinho (Alzir dos Santos Antunes) is an installation of a new hydro power plant/unit;
- HPP Monjolinho (Alzir dos Santos Antunes) is a project activity which result in new reservoirs and the power density of the power plant is greater than 4 W/m^2 (and it is also greater than 10 W/m^2), as described in the table 6;

The project activity`s power density, according ACM0002 methodology, is calculated as demonstrated below:

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}} \qquad \textbf{Equation 1}$$

Where:

PD = Power Density of the project activity, in W/m^2
Cap_{PJ} = Installed capacity of the hydro power plant after the implementation of the project activity (W);
Cap_{BL} = Installed capacity of the hydro power plant before of the project activity (W). For new hydro power plants, this value is zero;
A_{PJ} = Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m^2);
A_{BL} = Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2). For new reservoirs, this value is zero.

The table 6 below evidences that HPP Monjolinho (Alzir dos Santos Antunes) has a power density greater than 4 W/m^2 and also greater than 10 W/m^2.

Table 6: Power Density of HPP Monjolinho (Alzir dos Santos Antunes)

Item	HPP Monjolinho
Cap_{PJ}	74.000.000
Cap_{BL}	0
A_{PJ}	5.460.000
A_{BL}	0
PD	**13.55**

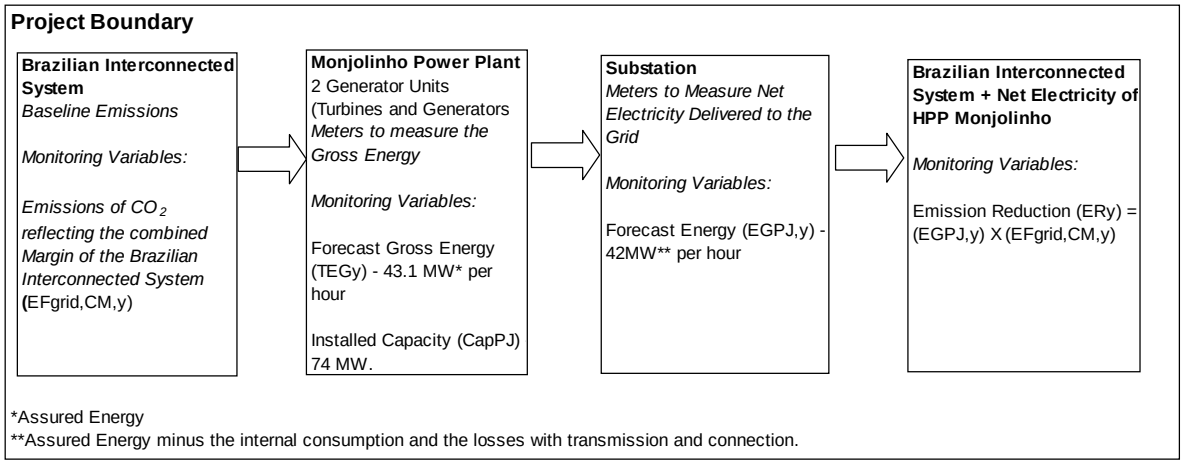
B.3. Description of the sources and gases included in the project boundary

The National Interconnected System (from Portuguese Sistema Interligado Nacional - SIN) is managed by ONS, which is responsible for all activities related to the operation's planning. The ONS traditionally subdivides the National Interconnected System into two subsystems interconnected: the South/ Southeast/Midwest Subsystem and the North/Northeast Subsystem. These Subsystems are related to the Brazilian geographic regions: South, Southeast, Midwest, North and the Northeast Region.

Due to the offer's real availability and the consumption behavior in each region, ONS establishes inter-regional energy exchange politics, besides exceptional attitudes to thermal generation dispatch, in case the storage levels of water significantly reduce and tend to violate the security curves. These conditions are permanently monitored and available to the electric industry agents.

According to ACM0002, version 10, the spatial extension of the project boundary includes the project power plant and all power plants physically connected to the electricity system that the CDM project power plant is connected to. The HPP Monjolinho is connected to National Interconnected System.

The flow diagram of the project boundary is:



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

Table 7: Emissions sources included in or excluded from the project boundary

	Source	Gas	Included?	Justification / Explanation
Baseline	CO_2 emissions from electricity generation in fossil fuel fired power plants that is displaced due to the project activity	CO_2	Included	Main Emission Source. In the absence of the Project, the presence of coal thermoelectric plants in the National Interconnected System would cause emission of GHGs.
		CH_4	Excluded	Minor Emission Source
		N_20	Excluded	Minor Emission Source

	Source	Gas	Included?	Justification / Explanation
Project Activity	For Hydro Power Plants, emissions of CH_4 from the reservoir	CO_2	Excluded	As described on the item B.2, the HPP Monjolinho's power density is greater than $10W/m^2$, so the GHGs` emissions from the project activities are zero (PE_y=0).
		CH_4	Excluded	
		N_20	Excluded	

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

In the absence of the project activity, the clean energy generated by Monjolinho Project dispatched to the Brazilian National Interconnected System (SIN) would have been generated through non-renewable

sources from Power Plants connected to the interconnected grid, fostering the emission of greater quantities of green house gases.

According to the methodology ACM0002, if the project activity is the installation of a new renewable grid-connected power generation plant, the baseline scenario is the following:

"Electricity delivered to the grid by the project would have been generated otherwise by the operation of a grid-connected power plant and by the addition of new generating sources, as reflected in the combined margin described in the Tool to calculate the emission factor for an electricity system."

The combined margin emission factor of National Interconnected Systemwill be calculated, according to the "Tool to calculate the emission factor for an electricity system" approved by the CDM Executive Board.

The CO_2 emission factors for power generation in the National Interconnected System, necessary to Combined Margin (CM) calculation, are calculated based on the generation record of plants centrally dispatched by the **National Operator of the System** (From the Portuguese: Operador Nacional do Sistema - ONS).

It will be, therefore, used the combined margin emission factor for the National Interconnected System to calculate the emission reduction of the project.

This baseline is perfectly applicable to HPP Monjolinho (Alzir dos Santos Antunes).

As an additional information, it can be noticed, through the projection established by the Ministry of Mines and Energy (MME) in the Decennial Plan of Electrical Energy Expansion[4] to the period of 2006-2015, that other activities and technologies that propitiate a higher emission of green house gases would occur in the absence of these project.

Brazilian Decennial Plan for Electric Energy Expansion (2006-2015)

In 2006, the Ministry of Mines and Energy elaborated the Decennial Plan for Electric Energy Expansion to the period of 2006-2015, establishing three possible scenarios, based on the growth projection of the country's Gross Domestic Product (GDP). We adopted to this analysis the scenario pointed out by the MME as the most likely to happen, called reference scenario. This reference scenario estimates the necessity of expansion of the Brazilian electrical sector.

Considering MME's projection, it was traced a plan for the generation expansion based on the energetic offer from the implantation of entrepreneurships of hydroelectric and thermoelectric generation. It was estimated a necessity of growth in the energetic offer which points to an additional energy's offer from thermoelectric entrepreneurships that will result on a volume of 10,486 MW in 2006-2015 period.

It is important to highlight that from the additional offer of 10,486 MW coming from thermoelectric Plants, the projection indicates that 1,769 MW will be generated from the entrepreneurships that will dispatch energy to SIN in the South Region of Brazil. The thermoelectric plants projected to start their operation through the South Region in the period of 2006-2015 are described below:

[4] Source: Ministério de Minas e Energia (MME) - Plano Decenal de Expansão de Energia Elétrica, 2006-2015

Table 8: Thermoelectric Power Plants to be developed in the Brazilian South Region predicted in the Decennial Plan for the Expansion of the Electrical Sector.

Power Plant	Capacity (MW)	Fuel	Start of Operation
Canoas	250	Natural Gas	January/08
Araucária	469	Natural Gás	December/08
Jacuí	350	Mineral Coal	December/08
Candiota III	350	Mineral Coal	December/08
Carvão Indic. S	350	Mineral Coal	December/09
Total	**1,769**		

It is also important to highlight that there are currently 7 thermoelectric plants in Brazil, operating with mineral coal, totalizing an installed capacity of 1,415 MW, according to the table[5] below:

Table 9: Thermoelectric Power Plants in Operation in Brazil

Power Plant	Capacity (MW)	State
Figueira	20	Paraná
Charqueadas	72	Rio Grande do Sul
Pres. Médici A, B	446	Rio Grande do Sul
São Jerônimo	20	Rio Grande do Sul
Jorge Lacerda I e II	232	Santa Catarina
Jorge Lacerda III	262	Santa Catarina
Jorge Lacerda IV	363	Santa Catarina
Total	**1,415**	

All the thermo electrical entrepreneurships that generate energy from mineral coal burning in the country are situated in the South Region, where Monjolinho Project is located.

The Energetic Expansion Plan to the period of 2006-2015 predicts a growth of approximately 74% in the offer of electrical energy based on mineral coal in the country, all the projects being located in the South region, connected to the National Interconnected System.

It is reasonable to consider that the electric energy generation of Monjolinho Project can avoid the thermo electrical entrepreneurships that generate energy from the burning of mineral coal, whether they are new or existent, from being activated.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (assessment and demonstration of additionality):

This item is elaborated based on "Tool for the demonstration an assessment of additionality", version 5.2, available on the website http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html .

This tool describes some steps to be followed to demonstrate and assess the additionality of the project.

Before the demonstration of the additionality through the application of the "Tool for the demonstration an assessment of additionality", as the starting date of the project activity is before the date of validation,

[5] Source: Aneel - http://www.aneel.gov.br/area.cfm?idArea=15&idPerfil=2

project participants demonstrate with the evidences below that the CDM was seriously considered in the decision to proceed with the project activity:

Evidence	Date	Subject
E-mail "Aproveitamentos Engevix"	9th May 2006	Engevix (Owner of Desenvix S.A which is the unique shareholder of Monjolinho Energética S.A) started to look for project developers to conduct the CDM process for its entrepreneurships, including HPP Monjolinho. The Project Developer Econergy sent an email to Engevix requiring information about hydropower CDM projects, including HPP Monjolinho. This e-mail has the objective to make a previous analysis about the project to present a commercial proposal.
E-mail "Econergy - Engevix, Projetos de MDL na PCH Santa Laura e na UHE Monjolinho". This email has two proposals attached.	11th May 2006	Econergy presented proposals to develop the CDM Project for HPP Monjolinho.
E-mail "Créditos de Carbono – Dúvidas Engevix"	13th June 2006	Flavio Bica, Civil Engineer of Engevix, sent an e-mail to the Project Developer ICF Consulting, saying that carbon credits are always considered in the Projects developed by the Group and requiring information sources to increase the company knowledge about carbon credits process.
Minute of the 1º Meeting of the Deliberative Board	28th August 2006	The Board required to the Nucleus of Projects Support (NAP), an internal team of the company, a study about CDM and Carbon Markets.
E-mail "Créditos de Carbono". This e-mail has two reports attached.	01th September 2006	Marcelo Loureiro, Electrical Engineer of Desenvix S.A., sent an email to some components of the Board, with reports analyzing carbon credits process and the possible financial revenues for some entrepreneurship, including HPP Monjolinho. He analyses the proposals presented by Econergy and recommended in the conclusion of this report (page 22) that the company just begin the CDM process for HPP Monjolinho in 2008, once the project operation will just start in 2009 and accordingly information provided in the proposals, the CDM process would take 8 (eight) months.
Minute of the 2º Meeting of the Deliberative Board	26th October 2006	The Nucleus of Projects Support (NAP) presented a report about the possibility of revenues with carbon credits. The Board establishes that the process to obtain CERs for Monjolinho project begins 15 months after the construction starting date.
Minute of the 11º Meeting of	16th October	The Board determined that the Carbon Credit

the Deliberative Board	2007	Process starts urgently. The Minute said that the revenues from selling carbon credits are necessary for the investment return.
Minute of the 12º Meeting of the Deliberative Board	5th December 2007	The Board determined that the process to hire a consulting company to develop the CDM Project for HPP Monjolinho should start immediately. The Minute still mentioned that the revenues from selling carbon credits are extremely necessary for the investment return.
Minute of the 13º Meeting of the Deliberative Board	24th January 2008	The company chosen to conduct the CDM Process for Monjolinho Project is presented to the Board. The Minute still cited that the process should begin immediately, once the revenues from selling carbon credits are fundamental for this project.
Contract Between Project Owner and Enerbio Consultoria	10th March 2008	Project Owner and Enerbio Consultoria assigned a contract which establishes that Enerbio Consultoria has the responsibility to develop the CDM Project and to negotiate the CERs.
Stakeholders Comments of PDD Version 01	11th April to 10th May 2008	Through the DOE Bureau Veritas Certification Holding S.A the first version of the PDD is put for public comments.
Approval from Brazilian DNA	9th December 2008	Brazilian DNA approves the CDM Project
Request for Registration	08th January 2009	Bureau Veritas Certification Holding S.A requests the project registration.
EB 48th Meeting	17th July 2009	The Board opinion expressed in the EB 48th Meeting that: "Monjolinho Energética S.A.'s CDM Project" (2362) submitted for registration by the DOE (BVC) could not be registered because the PDD submitted for validation and the project design have undergone major changes without the DOE issuing Corrective Action Requests, and therefore a recommencement of the validation is required.". This opinion was related mainly to the changes occurred in the installed capacity between the first version of the PDD put for validation and the PDD submitted for registration.
Update of the PDD	30th July 2009	Project Participants decide to follow the Board recommendation and they recommenced the process updating the PDD.

The following requirements are necessary to demonstrate and assess the additionality of the Monjolinho Project:

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:

- The continuity of the present scenario, with electricity generation happening according to the current generation composition of the National Interconnected System;

- The construction of a new mineral coal thermoelectric power plant, with similar installed capacity to the HPP Monjolinho (Alzir dos Santos Antunes);

- The project activity undertaken without being registered as a CDM Project Activity.

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

Both the project activity and the alternative scenarios are in accordance to the applicable laws and regulations. As exposed in item B.4 of this PDD, it is in the South Region where the only thermoelectric mineral coal plants of the country are located. Particularly, approximately 38% of thermo electrical coal plants of the country are located in Rio Grande do Sul. Moreover, according to the Brazil's Atlas of Electric Energy[6], 90% of the national reservations of mineral coal are concentrated in Rio Grande do Sul, where Monjolinho Project is located.

It is also remarkable that according to what was exposed in item B.4, the Ministry of Mines and Energy projects a growth in the offer of energy generation from mineral coal thermoelectric centrals and that this projection indicates that, until 2015, the capacity to generate energy of the entrepreneurships that dispatch energy from mineral coal in the South Region will grow approximately 74%.

It is important to clarify that the Brazilian Institutional New Model of the Electric Sector allows the private and public agents to decide the amount of energy to be hired and the investments to be realized from the participation in auctions of power plants and systems of transmission.

According to MME [7], "it is the agents of distribution that decide and compromise themselves to pay, through contracts resulting from auctions, amounts of electrical energy coming from new installations of electric energy generation to be delivered (…). With the distributors' information, the generators may then decide which new entrepreneurships of generation they wish to build, presenting in the auctions proposals of selling prices of their electric energy, competing for contracts of energy purchase from distributors. Additionally, the generators may also hire direct and freely with free consumers".

This way, it can be noticed that there are no restrictions in the applicable laws and regulamentations to the implantation of the alternative scenarios to CDM's activity project. Furthermore, we can also verify that through the MME's projection mentioned before there is even a tendency with great probabilities of occurrence of the alternative scenarios in the absence of projects similar to Monjolinho Project.

It is further noticeable that the Brazilian Institutional New Model of the Electric Sector provides autonomy to the economic agents about the investments to be realized in the Brazilian electric sector, not existing, therefore, restrictions nor impositions to the project activity and to its alternatives.

Thus, both the activity project and the alternative scenarios fulfil all the Brazilian norms and regulamentations, being also plausible according to the tendencies in the country's electrical sector.

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[6] Atlas de Energia Elétrica do Brasil [Atlas of Brazilian Electric Energy], ANEEL, 2002

[7] Ministério de Minas e Energia (MME) [Ministry of Mines and Energy] – Plano Decenal de Expansão de Energia Elétrica 2006-2015 [Decennial Plan for Energy Expansion 2006-2015].

Step 2. Investment analysis

Determine whether the proposed project activity is not:

(a) The most economically attractive; or
(b) Economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs);

To conduct the investment analysis, it must be used the following steps:

Sub-step 2a. Determine appropriate analysis method

The project generates financial and economics benefits, other than CDM related income, then, it will be used the benchmark analysis to analyse the project activity of Monjolinho Project.

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

It will be used the project internal rate of return (IRR) as a project financial indicator, due to it is the most commonly and appropriate indicator used to infrastructure projects` investment analysis. As a benchmark, it will be used Weighted Average Capital Cost – WACC - of the project.

WACC (Weighted Average Capital Cost)

The Weighted Average Capital Cost is calculated through the composition of costs and the participation percentage of each source of capital in the company's capital structure. The Monjolinho Energética S.A's Weighted Average Capital Cost was calculated according the equation below:

$$WACC = \frac{E}{V} * Re + \frac{D}{V} * Rd * (1 - Tc)$$ **Equation 2**

Where:

E/V = Percentage of Equity in Company's Capital Structure;
Re = Cost of Equity;
D/V = Percentage of Debt in Company's Capital Structure;
Rd = Cost of Debt
Tc = Income Tax in Brazil

To calculation of cost of equity was used the CAPM Model (Capital Assets Price Model), which indicates the following equation:

$$Re = R_f + \beta_i (ERP)$$ **Equation 3**

Where:

Re = Cost of Equity;
R_f = Rate of Return of a Risk Free Asset;
β_i = Beta Coefficient;
ERP = Equity Risk Premium;

To calculation of cost of debt was used the entrepreneurship's cost of lending.

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

Monjolinho Energética S.A. considers the project's cash flow a confidential information and, thus, it will be presented entirely to the Designated Operational Entity which will perform the validation and to any entity linked to the CDM that ask it for the purpose of proving the project's additionality. However, it will not be available in the PDD. The period of assessment in the context of the underlying project activity is 35 year as determined by its Concession Term present in the clause 2 (two) of the Concession Contract established with ANEEL (National Electric Energy Agency). The cash flow was elaborated according the following assumptions:

Table 10: Assumptions used at Monjolinho Project's cash flow

Concession Term	35 years
Energetic Characteristics	
Installed Capacity	74 MW
Assured Energy	43.1 MW
Connection Losses + Plant Consumption	1.54%
Energy in Transmission/Distribution connection point (without transmission losses)	42.44 MW
Transmission Losses	1.03%
Commercializable Energy (MWh, considering losses)	42 MW
Power Purchase Agreeements	
Selling Price	R$ 124.52/ MWh
Operational Expenses and Sectorial Taxes	
O&M	R$ 125 thousand/month + R$ 150 thousand/year (estimated)
Use of the Public Asset (UBP in Portuguese)	R$ 3,901,843 per year
Financial Compensation	R$ 57.63/MWh on 6.75% of the Assured Energy
Supervisory Tax ANEEL	R$ 289.22/kW over 0.5% of the installed capacity per year
Estimated TUST	R$ 2.222/kw per month
TUSD RGE	R$ 2.99/kw per month
CCEE Tax	R$ 24 thousand per year
ONS Tax	R$ 24 thousand per year
Research and Development	1% over Net Operational Revenue
Assets Insurance	0.4% per year over the invested value
Lending	
Cost of Deb	TJLP + 2.10 %
Grace Period	6 months
Amortization	16 years
Amortization System	SAC
Capital Structure	
Equity	R$ 81,715,112
Debt	R$ 199,255,688
Total Capital	R$ 280,970,800
Depreciation	
ANEEL	35%
Federal Revenue	20%

The assured energy is formally calculated and established for commercial purposes by the regulators (ANEEL and MME, Ministry of Mines and Energy). MONEL does not have control over decisions about changes and it is not sure about possible changes in the assured energy. With the change of the installed capacity from 67 MW to 74 MW, MONEL estimates an increase of 2 MW. But the responsibility of assured energy calculation is from the regulators and these organs have the authority to approve changes on that.

At June 2008 the investors asked to ANEEL and MME to recalculate the assured energy for the plant. So far, MONEL has not received any answer. Therefore, the electricity output of 43.1 MW is the official

value. But, to solve any doubt about the project additionality, Project Participants presented in the sensitivity analysis a variation in the assured energy.

The project internal rate of return resulting from the cash flow elaborated according to assumptions above is 7.88% per year.

To calculate the weighted average capital cost was used the following assumptions:

Cost of Equity:

To calculate the cost of equity, using the equation 3, the parameters adopted were the following:

- Re = Cost of Equity;
- R*f* = Rate of Return of U.S. Treasuries (T-Bond) of 30 years[8] + Median of Brazilian Risk between 2001 and 2006[9] + Average of Adjustment between U.S[10] Inflation and Brazilian Inflation[11] of the years 2004,2005 and 2006
- βi = Project Beta. To calculate the Project Beta, it was used the following steps: 1º Step – It was obtained the Levered Beta between the Electric Energy Index (IEE)[12] and the Bovespa Index (Índice Ibovespa) [13] for the period of august/2002 to July/2007; 2º Step – The Beta was Unlevered according the average capital structure of the companies that compose the IEE[14];; 3º Step – The Unlevered Beta was levered again according to the capital structure of the project. This Levered Beta was used for calculation of Monjolinho Project cost of equity.
- ERP = Equity Risk Premium in Brazil, calculated by Aswath Damodaran[15] according to data of Standard & Poors.

The table below presents the values used to cost of equity's calculation.

Table 11: Values Used on Cost of Equity's Calculation

Parameters	HPP Monjolinho
Rf - Rate of Return of a Risk Free Asset	**10.93%**
Rate of Return of U.S. Treasuries	4.38%
Median of Brazilian Risk	4.23%
Adjustment of Inflation	2.33%
Project Beta	**1.67**
Levered Beta (IEE - IBOVESPA)	0.93
Unlevered Beta	0.62
Equity Risk Premium	**7.79%**
CAPM	**23.94%**

Therefore, the cost of equity is 23.94% per year.

[8]Source: http://www.bloomberg.com/markets/rates/index.html

[9] Calculated Through the Average of the Index Índice EMBI + Brasil, available at: http://www.cbonds.info/index/search.php

[10] To measure the American Inflation the Index CPI – U. Available at: ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt

[11] To measure the Brazilian Inflation the Index IPCA was used. Available at: http://pt.wikipedia.org/wiki/Infla%C3%A7%C3%A3o#Hist.C3.B3rico_do_Quadro_Inflacion.C3.A1rio_no_Brasil

[12] The Electric Energy Index is composed by the stocks of the most representatives companies in the electric industry in the São Paulo Stock Exchange. Source of Data: São Paulo Stock Exchange. Available at: http://www.bovespa.com.br/Mercado/RendaVariavel/Indices/FormConsultaAnuaisFechDia.asp?Indice=IEE

[13] Index calculated by São Paulo Stock Exchange which reflects the average perfomance of the prices in Brazilian Stock Market. The stocks members of the theoretical portfolio answer for more than 80% of the number of business and of the financial volume negotiated in the spot market of São Paulo Stock Exchange.. Source: Bloomberg

[14] Data source of companies that compose IEE and their capital structure was São Paulo Exchange. Available at: http://www.bovespa.com.br/Mercado/RendaVariavel/Indices/FormConsultaCarteiraP.asp?Indice=IEE

[15] Available at http://pages.stern.nyu.edu/~adamodar/

Cost of Debt

The cost of debt is based on the cost of lending's contract. The Monjolinho project's funding was signed with BNDES according to conditions described on table 10. For financial and economic modeling effects, TJLP (Interest Tax of Long Term) was considered uniform during all lending period, with a value of 6.25% per year. The cost of debt is formed, thus, by TJLP plus 2.1% per year as banking spread, constituting a total cost of 8.35% per year.

Weighted Average Capital Cost

The project's capital structure is composed by 29.08% of equity and 70.92% of debt, as described on table 10. This way, considering a cost of equity of 23.94%, a cost of debt of 8.35%, an Income Tax + Social Contribution of 34% and applying the equation 2, there is a WACC of 10.8%

The table below shows a comparison's summary between the project's financial indicators and the benchmarks:

Table 12: Project Internal Rate of Return x WACC

Project IRR	WACC
7.88%	10.8%

The benchmark analysis was used (Option III) and it showed that project's indicator are less favourable than benchmark, then, it can be said that the CDM Project Activity cannot be considered as financially attractive.

Sub-step 2d. Sensitivity analysis

The three variables that might affect the project's finance are (i) the electricity price, (ii) the total amount of investment and (iii) the O&M Cost. As MONEL required to the regulators change in the assured energy, Project Participants present in the sensitivity analysis scenarios with the increase projected by MONEL (more 2 MW) and other variations. The variation in the assured energy reflects variation in the Plant Load Factor. The sensitivity analysis considers just the scenarios which contribute to increase the project's financial and economic attractiveness with the objective to confirm how solid the sub-step 2b and 2c's analysis is. These parameters were used because:

- The electricity price and the assured energy (or the load factor) are the unique parameters that can influence the revenues of the project. The assured energy is determined by Regulators Agent and the electricity price is established in the Power Purchase Agreeements (PPAs). All evidences related to these values were supplied to the DOE during the validation process.
- The operational expenses of the project are, in general, taxes and spending defined by regulators. The O&M Cost (Operation and Maintenance Cost) can suffer changes, but its variance does not affect significantly the IRR;
- The total amount of investment represents the most important cash outflow of the project.

It is important to say that: the electricity price is established in the PPAs where the price is firmed in R$ 124.52/MW; The investment amount is fixed as it was presented for the Financing Bank (BNDES) and as the Plant is already in operation this parameter cannot decrease; The Official Assured Energy of the Project is 43.1 MW and PPs expect that the assured energy increases 2 MW (4.64%) and the O&M Cost was based in the contract established with the company ENEL. Therefore, it is unlikely that these items can suffer alteration that will contribute to a different increase in the project's financial and economic

attractiveness that will not be covered in the range of variation between 0% and 10%. Therefore the range of variation between 0% and 10% covers more than the probable scenarios.

The table below presents the results for the main parameters variation which can affect project's cash flow.

Table 13: Monjolinho Project's Sensitivity Anaylsis

VARIATION ON ELECTRICITY PRICE UNTIL 2040		
Projected Situation	**MWh Price**	**Project IRR**
0%	**R$ 124.52**	**7.88%**
5%	R$ 130.75	8.46%
10%	R$ 136.97	9.02%

VARIATION ON INVESTMENT TOTAL AMOUNT		
Projected Situation	**Investment**	**Project IRR**
0%	**R$ 280,970,800**	**7.88%**
-10%	R$ 252,873,720	8.80%
-5%	R$ 266,922,260	8.32%

VARIATION ON O&M COST		
Projected Situation	**O&M Cost**	**Project IRR**
0%	**R$ 4.00/MWh**	**7.88%**
-10%	R$ 3.60/MWh	7.93%
-5%	R$ 3.80/MWh	7.90%

VARIATION ON ASSURED ENERGY		
Projected Situation	**Assured Energy**	**Project IRR**
0%	**43.1 MW**	**7.88%**
10%	47.41 MW	8.94%
5%	45.26 MW	8.42%
4.64%*	45.1 MW	8.38%

The sensitivity analysis demonstrates that the Monjolinho Project is not financially attractive once the entrepreneurship's internal rate of return is lower than the reference indicators in all scenarios analyzed.

The tool for demonstration an assessment of additionality says that:

"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)."

Therefore, as the sensitivity analysis having shown that the proposed activity is not attractive in the financial point of view, we should proceed to the fourth step (the analysis of common practices).

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

It is observed that there are in the South Region of the Country, region where HPP Monjolinho (Alzir dos Santos Antunes) is located, entrepreneurships with activities similar to those of the project being proposed.

It follows a summary of the numbers of electricity generation's entrepreneurships in operation in the Country's South Region, according information present in ANEEL's website:

Table 14 – Number of electricity generation's entrepreneurships in operation in the Country's South Region (Source: ANEEL[16] – March/2008)

Number of Entrepreneurships in Operation		
Type	**Quantity**	**%**
CGH	87	29.2
EOL	7	2.3
PCH	87	29.2
UHE	38	12.8
UTE	79	26.5
Total	**298**	**100**

Caption for Table 14:

- *CGH: Hydro Power Plant Central Generation (Installed Capacity smaller than 1 MW)*
- *EOL: Wind Power Plant*
- *PCH: Small Hydro Power Plant (Installed Capacity Greater than 1 MW and Smaller than 30 MW)*
- *UHE: Hydro Power Plant (Installed Capacity Greater than 30 MW)*
- *UTE: Thermal Power Plant*

The table presented show that 12.8% of electricity generation entrepreneurships in the southern region of the country are similar to the project Monjolinho's activities. The greatest part of these entrepreneurships has been implanted by state companies or organs, within the national energy development politics, when the sector was still centrally ruled. At that time, environmental legislation was softer and there was, according to Atlas of Electric Energy in Brazil[17],, the option of forming great reservoirs and for the inundation of big flooded areas in the construction of hydroelectric power plants in the country, with little consideration to the environmental aspects of the projects.

As examples of hydroelectric power plants similar to Project Monjolinho, implanted in the South Region, it can be cited HPP Passo Fundo, whose operation started in 1973, with an installed capacity of 220 MW and flooded area of 229.02 km² and the HPP Passo Real, with an installed capacity of 220 MW and a flooded area of 153.5 km², whose operation also started in 1973. Both entrepreneurships were developed by state companies.

[16] http://www.aneel.gov.br/area.cfm?idArea=15&idPerfil=2

[17] Atlas de Energia Elétrica do Brasil / Agência Nacional de Energia Elétrica, Página 45. – Brasília: ANEEL, 2002.

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

In spite of the existence of projects similar to Monjolinho Project's project activity in operation in the south region of the country, it is necessary to establish peculiar characteristics of these entrepreneurships that do not allow them to be configured as a common business scenario in the country.

According to the Atlas of Electric Energy in Brazil[18], the hydroelectric energy generation in Brazil is constituted essentially by major entrepreneurships. According to this study, the 23 hydroelectric power centrals of the country with a generation capacity of over 1,000 MW correspond to 71.4% of its installed capacity. Entrepreneurships of this magnitude present, for their generation capacity and consequent capacity of revenues, a great economic viability.

Still according to ANEEL, in the study mentioned above[19], the use of hydraulic potentials in Brazil to the generation of electric energy has historically demanded the formation of great reservoirs and inundation of big flooded areas. These constructions have used, in the majority of the cases, water accumulation reservoirs and regulations of water flow that provoked alterations in the regimen of water and the formation of microclimates, favoring, damaging or even extinguishing certain species.

Other fact that must be highlighted is that, analyzing the history of Brazilian electrical sector, it is verified that in the past the country's legislation did not incorporate the environmental variable in national electric sector planning. However, facing the undesirable social-environmental impacts resulting from the implantation of hydroelectric entrepreneurships, a series of legal demands that aim at avoiding and mitigating the environmental effects of this kind of project have become demands of the conceding power and of the legislative organs. With this, for the implementation of new hydro projects in Brazil there is a tremendous increase on investments regarding environmental and social issues, where in some cases become so higher that the financial attractiveness of new entrepreneurships can be seriously affected, also become not viable the implementation,.

HPP Monjolinho (Alzir dos Santos Antunes) is an entrepreneurship that has 74 MW of installed capacity and 43.1 MW of assured energy, being different, therefore, of the great national hydro electrical sites and not having the enormous potential of revenues of this kind of entrepreneurship. Moreover, HPP Monjolinho (Alzir dos Santos Antunes) is a run-of-the-river power plant that has a power density of 13.55 MW/km², with a flooded area of 5.46 km², presenting low environmental impacts and that considers in its planning a series of investments in programs and environmental actions that did not exist when there was the implantation of the greatest part of hydroelectric power plants in the Southern Region. This way, the implantation of this project does not count on large revenues from the great Brazilian hydroelectric entrepreneurships and has minimal environmental impacts that demand investment and, for these characteristics, its cash flow presents return rates below the markets references and the revenue from selling certified emission reduction becomes important to make the project possible.

It is also interesting to notice that as mentioned in sub-step 4.a, the number of hydroelectric power plants in the southern region of the country corresponds to only 12.8% of the entrepreneurships of its energetic matrix, presenting a greater concentration of small hydroelectric power plants and thermoelectric power plants. This greater quantity of small hydroelectric power plants in operation is directly associated to economical and tax benefits conceded by the Federal Government and to the creation, through the law nº

[18] Atlas of Electric Energy in Brazil / National Agency of Electric Energy, page 32. (*Atlas de Energia Elétrica do Brasil / Agência Nacional de Energia Elétrica, Página 32. – Brasília: ANEEL, 2002.*)

[19] Atlas of Electric Energy in Brazil / National Agency of Electric Energy, pages 45-46. (*Atlas de Energia Elétrica do Brasil / Agência Nacional de Energia Elétrica, Páginas 45-46. – Brasília: ANEEL, 2002.*)

10,438, in April 26, 2002, of the Program PROINFA. The massive presence of thermoelectric power plants in the region is closely related to the fact that the region detains 90% of the country's natural coal reserves, favoring thermoelectric power plants implantation.

It is necessary to clarify that Desenvix S.A. is a subsidiary of Engevix Engenharia S.A., created in 1995 to develop new businesses, especially in the area of electric energy generation in three states of Brazil - Rio Grande do Sul, Santa Catarina and Rio de Janeiro through its controlled companies. Desenvix S.A. is controlled by Engevix Engenharia S.A, which holds 100% of the social capital and its directors are the same shareholders of the controller company. A great part of the company's growth history is related to its performance in the energy sector and, this way, Desenvix S.A was created to make the participation of Engevix in energetic generation projects possible. Acting as a holding, the company develops its activities through its controlled companies that exercise the function of independent producers of energy in the national electrical sector. One of these controlled companies is Monjolinho Energética S.A. – MONEL, created specifically to implement and to operate Monjolinho Energética S.A.'s CDM Project.

Furthermore, it is important to highlight that the great majority of Hydro Projects that were not developed by state-owned companies were developed by consortium with several companies that shared the project risks. HPP Monjolinho is being developed by just one company (MONEL) that assumes all the projects risks and investments.

In the South Region of Brazil, region where HPP Monjolinho is located, there are 12[20] (twelve) hydropower plants above 30 MW that were not built by state-owned entities. It is important to say that in Rio Grande do Sul state, where Monjolinho Project is located, there are only 5 hydropower plants above 30 MW that were not built by state-owned entities, proving that this kind of project activity is not a common practice in this state as will be proven below .

As recommended by the sub-step 4a of the "Tool for the demonstration and assessment of additionality", Other CDM Activities (registered project activities and project activities which have been published on the UNFCCC website for global stakeholders consultation as part of the validation process) are not to be included in this analysis.

Therefore, the following HPPs above 30 MW must be excluded from the analysis, because they are CDM Project Activities (or they are registered or they were submitted for global stakeholders consultation):

- Hydropower Plants Fundão and Santa Clara (2 Power Plants in the same project): http://cdm.unfccc.int/Projects/DB/BVQI1186161655.85/view
- Hydropower Plant Monte Claro: http://cdm.unfccc.int/Projects/DB/DNVCUK1163591697.79/view
- _ Hydropower Plant 14 de Julho: http://cdm.unfccc.int/Projects/DB/SGSUKL1209121131.35/view
- Hydropower Plant Campos Novos: http://cdm.unfccc.int/Projects/Validation/DB/QJV07OUUF95DPM8EES0YT0G4KEW2DV/view.html

Therefore, there are only 7 (seven) other Hydropower Plants located in the South Region that were neither built from state-owned entities nor CDM project activities. The essential distinction between them and HPP Monjolinho are described below:

[20] It was used the profile of the Brazilian Electrical Sector of the "Atlas of Electric Energy of Brazil , 3rd edition " , year 2008 (ISBN: 978-85-87491-10-7) elaborated by National Agency of Electric Energy in November 2008 – pages 159 to 233.

- Hydro Power Plant Machadinho[21]: This entrepreneurship started to be built in 1998. It has an installed capacity of 1,140 MW which means that has an enormous potential of revenues that makes it more profitable and more financial attractive. It also presents more environmental impacts. Furthermore, to construct this entrepreneurship, it was created a consortium with 11 (eleven) companies associated (7 private companies and 4 state-owned companies). This type of configuration attenuates risks. Due to the size of this Hydropower Plant, it cannot be compared with HPP Monjolinho, because the revenues and the environment impacts are in another level.

- Hydro Power Plant Barra Grande: This project is under validation in the UNFCC (http://cdm.unfccc.int/Projects/Validation/DB/SONAXN2JJ91TO2UMXXJRRC4U6UKECB/view.html) but project proponents have requested the withdrawn from the CDM, therefore we included in this analysis. HPP Barra Grande has 708 MW of installed capacity and 380.6 MW of assured energy which means that has more revenues that makes it more profitable. Besides that, one consortium of 6 big Brazilian companies was formed to construct and operate this Plant.

- Hydropower Plant Castro Alves: This plant was withdrawn form the CDM (http://cdm.unfccc.int/Projects/Validation/DB/CJJACA7U4ILONCA4SXLQVQORWJMKCC/view.html) and it was also analyzed in common practice analysis.This plant is one enterprise of the CERAN Complex[22] that has three plants. (two of them are CDM projects – HPP Monte Claro and HPP 14 de Julho) in the same river (Antas River). CERAN was also implemented by a consortium with three shareholders and one of them is a state-owned company (CEEE) which has 30% of the complex. The fact that the Complex has three plants dilutes risks, mitigates risks of electricity generation and, therefore, risks of revenues generation. Furthermore the consortium formed by three companies also mitigates risks.

- Hydro Power Plant Quebra-Queixo[23]: The installed capacity is 121,5 MW and its assured energy is 59.7 MW what bring more revenues for the project and it makes it more financially attractive than HPP Monjolinho. It is also important to say that HPP Monjolinho is more efficient than HPP Quebra-Queixo because the load factor of HPP Monjolinho is 58.2% and the load factor of HPP Quebra-Queixo is 49.7%. HPP Quebra-Queixo started to be constructed in 2001 before the Kyoto Protocol entered into force. HPP Quebra-Queixo has two shareholders: Construtora Queiroz Galvão and Construtora Barbosa Mello S.A. They shared risks, profits and they can also have an easier access to the capital markets. This Hydropower plant is located in Santa Catarina state.

- Hydro Power Plant Ourinhos: This HPP is located between the states of Paraná and São Paulo. The construction had to be interrupted in 2003[24] due to technical and financial problems. Due to these financial problems, one of the biggest industrial group in Brazil, called CBA – Companhia Brasileira de Alumínio – bought the concession from another company (that had achieved the public concession before) and restarted the construction. This HPP has an installed capacity of 44 MW and a flooded area of 5.095[25] km2, therefore its power density is 8.63 MW/ km2, less than HPP Monjolinho power density, which means that to provide less energy, HPP Ourinhos needs to flood more area and impact more the environment. As it was said before, HPP Ourinhos started its construction before 2005, year when Kyoto Protocol got into force and due that the former investors face some financial barriers. The CDM will provide MONEL revenues to develop the project by itself and do not face the financial barriers that the former investors of

21 (http://www.machadinho.com.br/historico.html)

22 http://www.ceran.com.br/

23 http://www.uhequebraqueixo.com.br/dados.htm

24 http://www2.uol.com.br/debate/1292/regiao/regiao04.htm

25 http://www.aneel.gov.br/cedoc/areh2006296_1.pdf

HPP Ourinhos met. The construction of Hydro Power Plants by CBA has the objective of supplying electricity for its activities, where today 60% of its necessity of electricity is supplied by own hydro plants, and specifically for Ourinhos , 100 % of its production is for internal consume ,which is an essential distinction compared with Monjolinho.

It can be clearly seen that in Rio Grande do Sul, state where Monjolinho Project is located, hydro power plants like HPP Monjolinho are not the common practice in the state because there are few HPPs above 30 MW that are neither built by state-owned companies nor CDM Project Activities and which have different characteristics from HPP Monjolinho that were described above. If the analysis is wider considering all the South Region, it can be obtained the same conclusion where in the three states of this region, there are only 7 HPPs (including the two located in Rio Grande do Sul) with also different characteristics of HPP Monjolinho. If the analysis is still wider considering the other state where Desenvix S.A acts, Rio de Janeiro State, the same conclusion is also obtained, once just state-owned companies built hydro power plants there.

With this, we perceive that the reduced number of hydroelectric centrals is responsible for a great part of the country's installed capacity and that the hydroelectric power plants are not the main component in terms of number of entrepreneurships of the energetic matrix in the southern region of Brazil. Furthermore, it is possible to see that part of the hydroelectric entrepreneurships built in Brazil in the past had a high installed capacity, not respecting or establishing as a priority environmental questions, as it will happen in Monjolinho Project. It can be also clearly noted that the Hydro Power Plants that were built by private companies are usually implemented by consortium where several companies share the risks. In some of them, there are also state-owned companies in the consortium. HPP Monjolinho is being implemented by one unique investor that supports all risks. These characteristics make Monjolinho Project singular among the other entrepreneurships.

SATISFIED/APPROVED – Project is ADDITIONAL

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

According to ACM0002 methodology (version 10), the emission reduction are calculated as follows:

$ERy = BEy - PEy$ **Equation 4**

Where:

ERy = Emission Reduction in year y (t CO_2e/yr)
BEy = Baseline emissions in year y (t CO_2e/yr)
PEy = Project emissions in year y (t CO_2e/yr)

BEy Calculation (Baseline emissions in year y (t CO_2e/year)

The baseline methodology ACM0002 establishes that baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emission is calculated as follows:

$BEy = EG_{PJ,y} * EF_{grid,CM,y}$ **Equation 5**

Where:

BEy = Baseline Emission in year y (t CO_2e/year)
$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh/yr)
$EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system"

If the project activity is the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity (Greenfield renewable energy power plants), then:

$EG_{PJ,y} = EG_{facility,y}$ **Equation 6**

Where:

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

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

For the ex-ante estimation, it was considered for the variable $EG_{facility,y}$ the HPP Monjolinho (Alzir dos Santos Antunes) `s assured electricity minus the internal consumption and the losses with transmission and connection.

To calculate $EF_{grid,CM,y}$, it will be used the data supplied by the Brazilian DNA which makes available the data of Dispatch Data analysis operating margin emission factor and the build margin emission factor through using the steps suggested by the tool to calculate the emission factor for an electricity system (version 2).

The method chosen to calculate Monjolinho Project's emission factor was the Dispatch Data analysis OM. This method was chosen because it is, according to Brazilian DNA, the most accurate and the most recommended if information is available. Therefore, the emission factor will updated annually during the monitoring.

The calculation of the operation margin emission factor follows the dispatch data analysis OM emission factor ($EF_{grid,OM-DD,y}$) and it is calculated and defined by the Brazilian Designated National Authority in accordance with the dispatch data of the ONS - National System Operator.

The CO_2 emission factors resulting from the power generation in the Brazilian National Interconnected System (SIN) are calculated based on the generation record of plants centrally dispatched by ONS. The procedures for calculation were elaborated in cooperation between ONS, Ministry of Mines and Energy (MME) and the Ministry of Science and Technology (MCT). To calculate the operating margin and build margin emission factor only grid power plants are included in the calculation.

Following that procedures, from July of 2008, the operating margin emission factor started to be calculated for the National Interconnected System, considering the System as unique, and it became available to be consulted by the interested public and investors.

Until the preparation of this PDD, it is available information about dispatch data OM emission factor, related to the whole year of 2008 and some months of 2009.

The dispatch data OM emission factor for period from 2008 will be used for an ex-ante estimation of CERs generation, because they are the latest data available. All data used to calculate the ex-ante operating margin emission factor are available in the Annex 3 of this PDD.

Regarding the cohort of the power units to be included in the building margin, in terms of vintage of data, project participants can choose between one of the following two options:

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

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

The option that was chosen by project participants was Option 2.

The Build Margin emission factor resulted from the electricity generation in the National Interconnected System (SIN) are calculated based on the generation record of plants centrally dispatched by ONS. The procedure for calculation was elaborated in cooperation between ONS, MME and MCT and follows "Tool to calculate the emission factor for an electricity system"

The build margin emission factor for the year 2008 was used for an ex-ante estimation of CERs generation, since they are the latest data available. The data used to calculate the ex-ante build margin emission factor are available in the Annex 3 of this PDD.

The combined margin emission factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$$

Equation 7

Where:
$EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year *y* (tCO_2e/ MWh)
$EF_{grid,OM,y}$ = Operating Margin CO_2 emission in year *y* (tCO_2e/ MWh)
W_{OM} = Weighting of operating margin emissions factor (%)
W_{BM} = Weighting of build margin emissions factor (%)

The tool to calculate the emission factor for an electricity system recommends that the following default values should be used for W_{OM} and W_{BM}:

- Wind and Solar power generation project activities: W_{OM} = 0.75 and W_{BM} = 0.25 for the first crediting period and for subsequent crediting periods.
- All other projects: W_{OM} = 0.5 and W_{BM} = 0.5 for the first crediting period, and W_{OM} = 0.25 and W_{BM} = 0.75 for the second and third crediting period, unless otherwise specified in the approved methodology which refers to this tool.

This way, for Monjolinho Project, it was adopted the following weights: W_{OM} = 0.50 and W_{BM} = 0.50.

PEy Calculation (project emissions in year y (t CO_2e/year))

According to the methodology adopted, for most renewable power generation project activities, PE_y = 0. However some project activities may involve project emissions that can be significant. These emissions shall be accounted for as project emissions by using the following equation:

$$PE_y = P_{FF,y} + PE_{GP,y} + PE_{HP,y} \quad \textbf{Equation 8}$$

Where:

PE_y = Project Emissions in year y (tCO_2e/yr)
$P_{FF,y}$ = Project emissions from fossil fuel consumption in year y (tCO_2/yr)
$PE_{GP,y}$ = Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year *y* (tCO_2/yr)
$PE_{HP,y}$ = Project emissions from water reservoirs of hydro power plants in year *y* (tCO_2/yr).

For Monjolinho Project $P_{FF,y}$ and $PE_{GP,y}$ are zero.

Emissions from water reservoir

For hydro power project activities that result in new reservoirs and hydro power project activities that result in the increase of existing reservoirs, project proponents shall account for CH4 and CO2 emissions from the reservoir, estimated as follows:

(a) If the power density of the project activity (PD) is greater than 4 W/m2 and less than or equal to 10 W/m2:

$$PE_{HP,y} = \frac{EF_{Res} * TEGy}{1000} \quad \textbf{Equation 9}$$

Where:

$PE_{HP,y}$ = Project emission from water reservoir (tCO_2e/yr);
EF_{Res} = Default emission factor for emissions from reservoirs of hydro power plants in year *y* (Kg CO_2e/MWh);
TEGy = Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y (MWh)

(b) If the power density of the project activity is greater than 10 W/m2, $PE_{HP,y}$ = 0.

As described on the table 6 on the item B.2, the power density of HPP Monjolinho (Alzir dos Santos Antunes) is higher than 10 W/m2 and $PE_{HP,y}$ = 0 . Therefore, for Monjolinho Project, PEy = 0.

Leakage

No leakage emissions are considered. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (extraction, processing, and transport). These emissions sources are neglected.

Project Emissions Reductions

To summarize, the project emission reductions are calculated based on equation 4 of this PDD, in which PEy is zero (0). Therefore, the project emission reductions are calculated according to equation 5 of this PDD, where ERy = BEy = $EG_{PJ,y}$ * EFgrid,CM,y.

As HPP Monjolinho (Alzir dos Santos Antunes) is a new power plants, the emission reductions are calculated as the simple product between the quantity of net electricity supplied by the project activity to the grid times the combined margin emission factor, where the operating margin emission factor will be calculated according to the Dispatch Data analysis OM. and the build margin emission factor will be calculated through the option 2 which considers that this emission factor must be updated ex-post. Besides it will be considered 50% for the weights that forms the combined margin emission factor.

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

Data / Parameter:	Cap_{BL}
Data unit:	W
Description:	Installed capacity of the hydro power plant before the implementation of the project activity. For new hydro power plant, this value is zero.
Source of data used:	Project Site
Value applied	0
Justification of the choice of data or description of measurement methods and procedures actually applied	As HPP Monjolinho (Alzir dos Santos Antunes) is a new power plant, this value is 0 (zero).
Any comment :	

Data / Parameter:	A_{BL}
Data unit:	m^2
Description:	Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2). For new reservoirs, this value is zero.
Source of data used:	Project Site
Value applied	0
Justification of the choice of data or description of measurement methods and procedures actually applied	As HPP Monjolinho (Alzir dos Santos Antunes) is a new power plant, this value is 0 (zero).
Any comment :	

B.6.3 Ex-ante calculation of emission reductions:

As described on the item B.6.1, the project emissions reduction will be calculated based on equation 4, where it must be considered PEy as 0 (zero) and Leakage as 0 (zero). Therefore, the project emissions reduction will be calculated according equation 5, as follows:

ERy = BEy = $EG_{PJ,y} * EF_{grid,CM,y}$. **Equation 5**

Where:

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

It follows below the description about Monjolinho Project's emissions reduction calculation.

EG_{PJ}, Calculation

Table 15 – $EG_{PJ,y}$ Calculation

Period	Monjolinho
	EGPJ,y
2010	367.920
2011	367.920
2012	367.920
2013	367.920
2014	367.920
2015	367.920
2016	367.920
Total	2.575.440

Assumptions:

- $EG_{PJ,y}$ projections were made assuming power plant operation during 8,760 hour per year;
- The electricity generation is projected according to HPP Monjolinho (Alzir dos Santos Antunes)' s commercializable energy of 42 MW (Assured Energy less losses with transmission, connection and internal consumption);
- The projection assumed as the starting date of the first crediting period the date of registration on CDM EB, projected to be 1st January 2010.

Emission Factor Calculation

The table below shows a summary of the main parameters involved on the emission factor calculation:

Table 16: $EF_{grid,CM,2008}$ Calculation

Emission Factors	jan-2008	feb-2008	mar-2008	april-2008	may-2008	jun-2008	jul-2008	aug-2008	sep-2008	oct-2008	nov-2008	dec-2008
EFgrid,OM*	0.5727	0.6253	0.5794	0.4529	0.4579	0.5180	0.4369	0.4258	0.4102	0.4369	0.3343	0.4686
EFgrid,BM*	0.1458	0.1458	0.1458	0.1458	0.1458	0.1458	0.1458	0.1458	0.1458	0.1458	0.1458	0.1458
WOM	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
WBM	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
$EF_{Grid,CM,,2008}$	**0.3592**	**0.3855**	**0.3626**	**0.2993**	**0.3018**	**0.3319**	**0.2913**	**0.2858**	**0.2780**	**0.2913**	**0.2400**	**0.3072**

The emission factor which will be used for *ex-ante* estimation of emission reduction of **Monjolinho Project** is 0.3112; which was obtained from simple arithmetic average of monthly $EF_{Grid,CM,2008}$ of National Interconnected System.

Observations:

- The most recent information available by Brazilian Designated National Authority for complete years refers to the year 2008;
- The daily data for Operating Margin Emission Factor is available on Annex 3;
- The hourly data for Operating Margin Emission Factor are available on the links: http://www.mct.gov.br/index.php/content/view/303077.html#ancora

Therefore, the ex-ante estimation of project emission reduction is shown through the table below:

Table 17 – Ex-ante estimation of Monjolinho Project's Emissions Reduction (tCO_2)

Year	Total (tonnes of CO2 e)
2010	114.484
2011	114.484
2012	114.484
2013	114.484
2014	114.484
2015	114.484
2016	114.484
Total	801.391

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

Table 18 – Summary of the ex-ante estimation of emission reduction

Year	Estimation of project activity emissions (tonnes of CO2 e)	Estimation of baseline emissions (tonnes of CO2 e)	Estimation of Leakage (tonnes of CO2 e)	Estimation of overall emission reductions (tonnes of CO2 e)
2010	0	114.484	0	114.484
2011	0	114.484	0	114.484
2012	0	114.484	0	114.484
2013	0	114.484	0	114.484
2014	0	114.484	0	114.484
2015	0	114.484	0	114.484
2016	0	114.484	0	114.484
Total (tCO2 e)	0	801.391	0	801.391

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

B.7.1 Data and parameters monitored:

The consolidated baseline methodology for grid-connected electricity generation from renewable sources, version 10, must be applied together with the monitoring methodology present into that methodology.

Based on the applied methodology and on what was described on the item B.6.1, there are neither leakage nor project emissions to be monitored. Therefore, the parameters to be monitored are just the project's installed capacity, the electricity generation by the project and the project activity's power plants reservoirs area.

This energy measurement is essential to verify and monitor the GHGs emission reduction. It is necessary, therefore, to use meter equipment to register and check the electricity generated by the unit. The Monitoring Plan (item B.7.2) allows the calculation of GHG emissions generated by the project activity in a direct manner, applying the baseline emissions factor.

All data collected as part of monitoring will be archived and be kept at least for 2 years after the end of the last crediting period. All measurements will be conducted with calibrated measurement equipment according to Brazilian industry standards.

Data / Parameter:	**($EG_{facility,y}$)**
Data unit:	MWh/yr
Description:	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y
Source of data to be used	Project Activity Site
Value of data applied for the purpose of calculating expected emission reduction in section B.5	The value used for the purpose of calculating expected emission reduction in section B.5 was 42 MW. This value was obtained from the assured energy of the plant less losses with transmission, connection and internal consumption.
Description of measurement methods and procedures to be applied (if any)	Spreadsheets will be used, obtained directly from the electricity meters with information generated hourly or within every 15 minutes. Monthly, the information will be checked with the generation spreadsheets available at the CCEE's Website. Besides, information of generation can be checked by receipt of sales, if it is necessary to do so. Continuous measurement and at least monthly recording will be the monitoring frequency.
QA/QC procedures to be applied:	The uncertainty level for these data is low. They will be used to calculate the emission reductions. The electricity generated will be monitored by the project participants and it will be checked by spreadsheets available at the CCEE`s Website (information comparison between operation data and CCEE reports).
Any comment:	*CCEE - Entity responsible for measurements, accounting and settlement on Brazilian electric energy market.

Data / Parameter:	**TEG_y**
Data unit:	MWh

Description:	Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y.
Source of data to be used:	Project Activity Site
Value of data applied for the purpose of calculating expected emission reduction in section B.5	This data was not used to calculate the expected emission reduction, but it can be considered as the assured energy of the plant..
Description of measurement methods and procedures to be applied (if any)	Spreadsheets will be used, obtained directly from the meters with information generated hourly or within every 15 minutes. Continuous measurement and at least monthly recording will be the monitoring frequency.
QA/QC procedures to be applied:	The uncertainty level for these data is low. The electricity generated will be monitored by the project participants.
Any comment:	It is not applicable for this project, because the power density is higher than 10 MW/m^2.

Data / Parameter:	$EF_{grid,CM,y}$
Data unit:	tCO_2/MWh
Description:	Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system".
Source of data to be used:	*Ex-post* emission factor will be calculated by Enerbio Consultoria through ONS data supplied by Brazilian DNA. The variables $EF_{grid,OM,y}$ and $EF_{grid,BM,y}$, necessary for $EF_{grid,CM,y}$ calculation, will also be monitored and calculated through the Dispatch Data of the National Interconnected System.
Value of data applied for the purpose of calculating expected emission reduction in section B.5	The values of ($EF_{grid,CM,y}$) Combined Margin CO_2 Emission Factor which were used for *ex-ante* estimation of emission reduction of Monjolinho Project is 0.3112 which was obtained from simple arithmetic average of National Interconnected System monthly $EF_{grid,CM2008}$ as described on table 16 on the item B.6.3 and as described on the Annex 3.
Description of measurement methods and procedures to be applied (if any)	As per the "Tool to calculate the emission factor for an electricity system".
QA/QC procedures to be applied:	As per the "Tool to calculate the emission factor for an electricity system". The uncertainty level for these data is low.
Any comment:	

Data / Parameter:	**Cap_{PJ}**
Data unit:	W
Description:	Installed capacity of the hydro power plant after the implementation of the project activity.
Source of data to be used:	Project Site
Value of data applied for the purpose of calculating expected emission reduction in section B.5	This data was not used to calculate the expected emission reduction. But it can be considered the value of 74 MW, according the Installation License (LI nº 886/2008-DL) issued by FEPAM.

Description of measurement methods and procedures to be applied (if any)	The installed capacity will be monitored annually by Aneel, environment regulators or by sub-hired companies, according recognized standards. It will be monitored yearly.
QA/QC procedures to be applied:	The uncertainty level for these data is low. The installed capacity is determined on the project's beginning and it will be monitored by the Regulator Agent.
Any comment:	

Data / Parameter:	$\mathbf{A_{PJ}}$
Data unit:	m^2
Description:	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full.
Source of data to be used:	Project Site
Value of data applied for the purpose of calculating expected emission reduction in section B.5	The HPP Monjolinho (Alzir dos Santos Antunes) `s area of the reservoir was used for the purpose of calculating expected emission reduction in section B.5. It was used a value of 5,460,000 m^2.
Description of measurement methods and procedures to be applied (if any)	It will be performed a topographical measurement to measure the area of the reservoir after it is completely full.
QA/QC procedures to be applied:	The uncertainty level for these data is low. The Area of the reservoir is monitored by environment regulators. Any changes in this area must be approved by regulators. It will be monitored yearly.
Any comment:	

B.7.2 Description of the monitoring plan:

The Monitoring Plan is elaborated according to the Monitoring Methodology included in the consolidated baseline methodology for grid-connected electricity generation from renewable sources ACM0002, version 10.

Responsibilities

- Operation and Maintenance Board: responsible for activities related to the plant's operation and maintenance.

- Special Measurement Area, linked to Operation and Maintenance Board: responsible for collecting information directly from the HPP Monjolinho (Alzir dos Santos Antunes)'s meters and for sending it to Electric Power Commercialization Chamber (CCEE). The Special Measurement Area is also responsible for the consolidation and analysis of monthly generation spreadsheets and for System of Energy Data Collection (SCDE), through the collected data consistence analysis and software operation monitoring.

- Measurement Outsourced Agent: Part of the Special Measurement Area's responsibility can be outsourced with a Measurement Agent's hiring. In this case, the Special Measurement Area is responsible for supervising the work performed by the Measurement Outsourced Agent.

- Electric Power Commercialization Chamber (CCEE): it is responsible for implantation, operation and maintenance of SCDE, to enable the collection of electric energy's data for the use of Accounting and Settlement System (SCL), aiming at assuring the accuracy of the amounts measured, as well as the meeting of the required deadlines

Process Description

I – Procedure of Generation Data Collection

There are two data collection channels in each measurement points. A channel is used by the company for direct collection and the other one is used by CCEE for data sent validation.

In the company, Special Measurement Area is responsible for obtaining data directly from the meters and make available in files on xml format. Data obtained by the company are sent daily to CCEE through SCDE system which makes the National Interconnected Grid measurement point generation and consumption data's collection and treatment.

The Special Measurement Area is also responsible for generating, at each month in the first working day, based on consultation from a meters` database, the spreadsheets with the generation data, consolidated hourly, regarding the previous month. These files are sent to CCEE in TXT format.

The procedure quoted above might be outsourced through a Measurement Agent's hiring. In this case, the Special Measurement Area is responsible for supervising the work performed by the Measurement Outsourced Agent

In CCEE, the collected data, through SCDE, are transferred to the software SCL to accounting and financial clearance based on the CCEE's Rules and Procedures for Commercialization

II – Data Consolidation Procedure:

CCEE compares data available and if an inconsistency occurs, it will be generated a non-conformity report that will verify with CCEE the cause for the disagreement between the information

In case of unavailability of any measurement point, due to maintenances, commissioning or for any other reason, the methodology of data estimation will be used according to the item 14.3 of the Commercialization Procedure PdC ME.01.

III – Data Storage:

The generation information, both the internally generated and the spreadsheets generated through the CCEE website, are electronically stored by the Operation and Maintenance Board.

Periodically, the Information Technology Area accomplishes a insurance backup for all company`s data through a Data Server *backup.*

All data collected as part of the monitoring will be archived and be kept for at least 2 years after the end of the last crediting period.

IV – Confronting of the internal generation data with the third part reports

The internal information might be confronted with data available on CCEE *website*.

V – Calibration of Meters (measuring tools):

The calibration of meters will follow what was described on the document elaborated by ONS – Sub module 12.3 - Maintenance of the measurement system for billing, which establishes that:

(a) The periodicity for the responsible agent's preventive maintenance for Measurement System for Billing (SMF) is of 2 (two) years at the most. That periodicity can be altered in function of the occurrence history observed for all facilities.

(b) The preventive maintenance can be postponed by the period of up to 2 (two) years, in the case of happening inspection in the measurement point. The postponement of that maintenance starts to apply from the inspection date.

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)

The baseline study and monitoring methodology for the project activity were elaborated by Enerbio Consultoria and they were completed on 31/07/2009. Enerbio Consultoria is also a project participant.

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

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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:

16/07/2007 (Construction's Beginning)

16/07/2007 is the issue date of the Construction Service Order (from the Portuguese: Ordem de Serviço de Construção) to COMAX Terraplenagem Ltda. to the service of common excavation of left and right margins and ground work for construction site of HPP Monjolinho (Alzir dos Santos Antunes).

Item B.5 of this PDD presented a timeline table that shows all the actions taken from Project Owner to secure the status of CDM Project for the Project.

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

35 years

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

The project activity will use renewable crediting period.

C.2.1. Renewable crediting period

7 years and it can be renewed at most two times

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

The date which occurs later between:

- 01/01/2010 (Prevision for Registration in CDM EB) or
- Project`s Registration in CDM EB.

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 leading to a requirement for more sensitive environmental management practices. This is increasingly reflected in legislation and policies around the world. In Brazil, the situation is not different. The licensing policies and environmental rules are very demanding, just as the best international practices.

In Brazil, it is required to 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, a series of licenses from the pertinent environmental agency (federal and/or local, depending on the project).

To obtain all the environmental licenses, every hydroelectric project must mitigate, when it exists, the following impacts:

- Inundation of indigenous lands and slave historic areas – authorization for that 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;
- Inundation of cemeteries and other sacred locations.

The process begins with an environmental impact study (EIA) undertaken by the entrepreneur and it follows with the previous analysis (preliminary studies) made by the local environmental department. Afterwards, if the project is considered environmentally feasible, the sponsors have to prepare an environmental assessment, which is basically composed of the following information:

- Reasons to implement the project;
- Project Description, 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 (LP), which reflects the positive understanding of the local environmental agency on the project environmental concepts.

To obtain the installation license (LI), it is necessary to present (a) additional information about the previous assessment; (b) a new simplified assessment; or (c) the Environmental Basic Project (PBA) according to the resolution of the environmental agency informed on the LP.

The operation license (LO) is requested during the final phase of the construction and it is obtained after the entrepreneur proves that all exigencies made by the local environmental agency were fulfilled.

Below, it follows the HPP Monjolinho (Alzir dos Santos Antunes)'s historical licenses, which were provided to the Designated Operational Entity in the validation stage

- Prior License (LP) - nº 1065/2005 – DL
  - Signed on:19/12/2005
  - Valid until: 19/12/2007

- Installation License (LI) - nº 886/2008 – DL
  - Signed on: 15/08/2008.
  - Valid until: 23/03/2010.

- Operation License (LO) - nº 2282/2009 – DL
  - Signed on: 14/05/2009.
  - Valid until: 13/05/2013.

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. The Monjolinho Project presents little necessity of reservoir's flooded area and satisfies the several demands of the state's environment legislation and of the Brazilian electric system, having the necessary licenses for its implantation.

It will be developed 24 programs and actions, aiming at minimizing and mitigating the environmental impact of entrepreneurship in the physical, biotic and anthropic fields.

The whole programs that compose the Basic Environmental Project were elaborated according to the latest management techniques of natural and social resources. It follows below in detail some actions which will be executed on Monjolinho Project.

Program of control of erosive processes

This program has the objective of following the occurrence and development of the erosive processes in the margins of the reservoir, avoiding the silting and the consequent reduction of its useful life, besides reintegrating the areas of the working fields and of the mandatory excavations in the regional landscape. The program's activities consist in data survey, implantation of a system of geographical information and of a phenomenological modeling, field surveys and laboratory tests which will support the elaboration of the plan for stabilizing erosive figures and landslides.

After these activities, a monitoring project of the hillsides will be implanted and, when necessary, preventive or corrective measures will be executed in order to control erosions and stabilization processes.

Monitoring Program of subterraneous waters

The main program has the objective of monitoring the static and freatic level and the quality of water of the identified wells in the HPP Monjolinho (Alzir dos Santos Antunes)'s area of direct influence, evaluating the possible effects of the implantation and operation of this HPP in the variation of the freatic level and quality of water in these wells. This program shall be integrated to the Superficial Water Quality Monitoring Program and also to the Contribution Basin Management.

The activities predicted in the PBA embrace complementary studies to the identification of existing wells in the area of reservoir`s influence and monitoring the quality of water of the static and freatic levels of the selected wells. In the reservoir areas monitoring piezometers will be installed.

Program of recuperation of degraded areas

This program seeks to establish procedures to reduce the impacts caused by the implantation of the HPP Monjolinho (Alzir dos Santos Antunes) and to recuperate the degraded areas of the working field, aiming at its future use. The activities in this program involve periodic meetings with the company executing the sites. In these meetings, initially, responsibilities will be defined and activities to capacitate the ones involved in the execution of the program will be realized.

After this, Monjolinho Energética S.A. and the sub-hired company responsible for the work will provide the necessary data to the identification of the areas to be recovered (plants, schedules and other information that clarify the uses of each area along the execution of the site). Based on that information, Monjolinho Energética S.A. will start the planning of the recuperation activities, establishing which preventive/corrective measures must be adopted.

Superficial Water Quality Monitoring Program

The objective of this program is to monitor the limnologic parameters of the rivers Passo Fundo and Erechim, in the HPP`s area of influence, gathering the technical information necessary to the identification and mitigation of possible impacts generated by the formation of the reservoir on the quality of water, and to the maintenance of quality classes and their prepWhererant uses.

This program should be integrated to the Monitoring Program of Subterraneous Waters and to the Contribution Basin Management program. Monthly campaigns are predicted for sampling the physical-chemical and biotic parameters during the period of one year from the beginning of the construction, becoming held every three months till the filling of the reservoir. During this filling, the sampling will be done weekly. Afterwards, the campaigns will be monthly during the first six months of the reservoir, passing to a three-month basis after this period. To this program performance reports are predicted to be

written every three months. After the first year of monitoring, the periodicity of the samples must be evaluated along with the state environmental organ – FEPAM.

Contribution Basin Management program

This program's main objective is to conciliate the anthropic use of the reservoir's contribution basin, looking for ideal conditions for environmental generation, conservation and security. Its activities will be developed throughout the whole execution of the PBA, until May 2010.

Environmental education program

Activities along the school communities in the entrepreneurship's influence area will be realized, with focus on the capacitating of teachers of municipal state education network which act in the municipalities covered by the entrepreneurship, besides capacitating activities with the workers of the hired companies and educational activities with residents surrounding the reservoir. This program must have intense integration with the programs of Social Communication, Prevention of Accidents and Public Health and Conservation and Use of the Reservoir Waters and its Surroundings.

Reforestation program

In constant and intense correlation with the Flora Rescue Program, this program aims at elaborating reforestation projects in the permanent preservation areas and other available for planting, besides the production and supply of branches obtained from seeds collected in the area of the entrepreneurship's direct influence, seeking the preservation of the local genetic material. Until the phase of reservoir's fulfillment, it is predicted the planting of approximately 2 thousands branches of native species

Flora rescue and salvation program

Through this program, inventories to the identification and localization of samples of the local flora will be realized, with the interest of conservation. Seeds and other vegetable material will be collected throughout the period of implantation of the HPP, with the objective of creating a germplasm bank, allowing the production of branches that will be used in the Reforestation Program. For this, it will be implanted a forest nursery with a capacity to produce 60 thousand branches per year.

Macrophytes monitoring program

This program has the objective of surveying the macrophytes species present in the entrepreneurship's region, identifying the potential invaders and elaborating a plan to handle such species, controlling possible biological invasions. Prospecting campaigns will be executed in the region and, after the reservoir's filling, monitoring and control campaigns of the macrophyte population in the reservoir will take place every two months.

Fauna Rescue and Monitoring program

Throughout all the process of deforestation of the area to be flooded, two biologists and two assistants will remain on the field, being responsible for the execution of the mild rescue. Periodically, campaigns to monitor the fauna will be executed, with a staff composed by an entomologist, a herpetologist, an ornithologist and a mast zoologist, besides field assistants.

Samples of the insect fauna and other disease vectors that may occur in the region will be realized, according to the data presented in the diagnosis carried out. Along with the activities of Environmental

Education, with the programs of Public Health and Use of the Reservoir's Surroundings, activities of prevention and control of diseases and infestation vectors will be developed. Besides, the data about the occurrence of hematophagous bats will be monitored, seeking to map the populations and to inform the state's Health and Agriculture Secretaries, as agreed in meeting with the Centro de Vigilância em Saúde do Rio Grande do Sul (Center of Health Vigilance of the state of Rio Grande do Sul).

Accident prevention and public health program

This program has as objectives: (i) to elaborate a system of epidemiologic vigilance, centered in the prevention of the introduction and control of existing vector; (ii) elaborate a program of worker's health, aiming at the workers in the site and the population involved, avoiding aggravations and permitting a better quality of life and (iii) to structure mechanisms of prevention of accidents with venomous animals, notably in the phases of deforestation, detour of the river and filling of the reservoir.

The environmental indicators used, always taking into consideration the site conditions prior to the entrepreneurship, are: (i) the profile of hospital morbidity; (ii) the profile of mortality, notably in groups of infectious-parasite, causes of the respiratory system and external; the prevalence of cases of accidents with venomous animals; (iii) the prevalence of endemic diseases or of compulsory notification. The workers admission and resignation exam, as well as periodic health tests adopted by the companies working in the implantation of the entrepreneurship, will constitute indicators of the program in the sphere of the worker's health.

Program of adequacy in traffic conditions

To satisfy the necessities of adequate roads to the traffic demanded by the development of the building site, it will be necessary to execute improvement in the roads that give access to the site, in special the interval of 7 km which will connect Nonoai to the construction site, with rectifications of design, adequacy to the draining system and signalizations.

This improvement should be executed in all the roads that will receive the traffic from the site, considering the increase in the flow which will last during the construction period. The alterations in the traffic will be considered under the aspect of increase in the road and urban traffic. The increase in the road traffic will reflect in the amplification of the flow of vehicles in the roads RS-480 and RS-486 and in the road that connects Nonoai to Faxinalzinho, which structures the region of the entrepreneurship`s implantation. This increase in the traffic will be due to the mobilization of equipment, transport of materials and of people allocated in the site, being represented by heavy and light vehicles. It is expected an increase in the intensity in the zones near the dam, mainly due to the transport of clayey soils, sand and crushed rock.

The aspect of urban traffic intensification will probably occur in the city of Nonoai, once a considerable amount of the economical movement coming from the construction site will be concentrated in its surroundings.

Program of social communication

Landscape transformations, such as the implantation of a HPP and all the alterations provoked by it generate impacts, curiosities and doubts among the population of the region, both in direct and indirect entrepreneurship's areas of influence.

In this context, the social communication performs a key role, once it attempts to minimize these feelings and involve the population with the project through the exchange of information, making use of the

Program of Social Communication. This program's target people are the ones affected by the construction, the city's authorities, NGOs, syndicates, associations, communitary leaderships, the press and others that manifest interest.

The interest and manifestation of the population in relation to the themes covered are necessary and fundamental conditions so that this program becomes successful, both in the form of organization and in the progress of developed actions, which indicate the possibility of alterations and adaptations throughout the execution of the program. Moreover, the interaction and the involvement of the entrepreneur with the population of the region are primary factors to the implantation of the program.

Program of conservation and use of the waters and their surroundings

The Environmental Plan of Conservation and Use of the Artificial Reservoir's Waters and its Surroundings, also named PACUERA, has the objective of establishing mechanisms to make an environmentally balanced use of the lake and its surroundings possible, according to the precepts of the legislation, to the necessities of the entrepreneurship and to the interaction with the society.

In order for PACUERA to reach this goal, it will be necessary that the users and authorities be conscious of the potentialities and frailties of the new context (the reservoir), from the knowledge which is passed on to them. The Plan should be developed aiming at mechanisms of protection of the environment quality through a Code of Usage and through a cartography zone that is simple and easily understood, searching for its operation by the municipalities and other managers.

Environment management program

The program will be executed by a multidisciplinary team, in order to guarantee the attendance to the current environmental legislation pertinent to the entrepreneurship, to promote the exchange of experiences among the environmental programs of PBA, and to guarantee the control of the execution, seeking the implantation from its totality.

This program's staff is responsible for the emission of all reports referring to the progress of PBA, as well as the relation entrepreneur-supervising organ. The environment management program is justified by the necessity of permanent exchange among the environmental programs in PBA.

This program should organize and make it compatible the implantation of environmental programs of PBA, enhancing and accompanying the stages in the execution of each one, as well as directly interfering in the search of synchronism among the activities and in the optimization of the results. The management should decide the beginning of reviews of the PBA whenever necessary to adjust the program and/or procedures, or due to new demands, as well as fulfilling the responsibility of interlocution with the licensing organs.

In order to perform these functions, the management staff should collect and compile the data generated by the implementation of the programs, in order to dispose the information organized and coherently to the execution of the PBA, facilitating the decision taking to the management. In the same way, all the information referring to the licensing should be considered, always bearing in mind the maintenance of feasible deadlines to the realization of the tasks to an efficient service of the demands of the licensing organs.

In the scope of this organ are included the activities and studies necessary to the licensing of energy transmission's line and of all road and accesses related to the entrepreneurship, even if this determines the opening of new processes of environmental licensing.

Environmental Plan for the Construction – EPC

During all entrepreneurship's implementation process, sub-hired companies will be oriented to adopt techniques which consider the best engineering solutions, aiming at the environmental protection. It will be activities of this program the support to sub-hired companies in the environmental management of the construction through the elaboration of an executive project of EPC; programs of control of accidents and fires; supervision of activities in the working areas and management of licenses and building permission. The program has a direct relation to the Environmental Education to the development of education activities of the workers in the site.

SECTION E. Stakeholders' comments

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

According Brazilian DNA resolutions, local stakeholder must be invited to comment the CDM Project.

Therefore, the project proponents sent letters to the following local stakeholders:

Table 19 – Local stakeholders consulted

Local Stakeholders	Name
Faxinalzinho	
City Hall	Mr. Irineu Bertani
Municipal Assembly	Mr. Irineu da Costa
Municipal Agriculture and Environmental Secretary	Mr. Ari Jorge Moreto
Nonoai	
City Hall	Mr. Ademar Dall'Asta
Municipal Assembly	Mr. Carlos Gosch
Environmental Department	Mr. José Moreira
Benjamin Constant do Sul	
City Hall	Mr.. Jairo Cina
Municipal Assembly	Mr. Leonor Cesar Grasieli
Environmental Department	Mr. Claudenir Luís Finato
Entre Rios do Sul	
City Hall	Mr. Volnei Luis Pedott
Municipal Assembly	Mr. Jerry Adriano Payer
Community Associations	
Association of Faxinalzinho Residents	Mr. Ido Marcon
Nonoai's Social Welfare House Love and Charity	Ms. Volnete Zanetti
Association of Nonoai's Children CEMACAAD	Ms. Nair Menegol
Patran	Mr. Fontana
APAE - Association of Fathers and Friends of Nonoai's Exceptional People	Mr. Carmem Debastiani
Commercial, Industrial, Service, Agriculture and Cattle Raising Faxinalzinho's Association	Mr. Edgar Luiz Valentini
District of Nonoai Attorney of Justice	Mr. Marcelo José da Costa Petry
Commercial, Cultural, Industrial, Service and Agriculture and Cattle Raising Nonoai's Association	Mr. Ademir Oliveira
Cultural Association of Community Radio Dissemination Benjamin Constant do Sul	Mr. Gilberto Lovato
Association of Benjamin Constant do Sul Residents	Mr. Arlindo Menegueti
Commercial Industrial Entre Rios do Sul Association	Mr. Mauri Antonio Benin
Others Local Stakeholder	
State of RS Attorney for Public Interest	Mr. Mauro Henrique Renner
Federal Attorney for Public Interest	Mr. Antonio Fernando Barros e Silva de Souza
Brazilian Forum of NGOs and Social Movements for Environment and Development	Mr. Rubens Born
State Environmental Agency	Mr. Carlos Otaviano Brenner de Moraes
Environmental Protection State Foundation Henrique Luis Roessler (FEPAM)	Ms. Maria Isabel Chiappetti

Besides the letters sent to local stakeholders, the PDD was available to public comments for the local stakeholders at the website www.enerbio-rs.com.br.

E.2. Summary of the comments received:

There was just a comment, carried out from Secretary of Agriculture and Environment of Faxinalzinho city.

The secretary of Agriculture and Environment of this city said that he is optimistic about the project and asked that, in the moment of production and supply of native seedlings to be planted in the outskirts of the dam and of the reservoir, some seedlings be passed to the Secretary with the objective of donating to farmers of some localities in the interior of the municipality. Through this action, the Secretary of Agriculture and Environment of Faxinalzinho seeks to promote the forestation and reforestation, increasing the area of native forests in all locations of the city.

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

MONEL incorporated the comment and the request made by the Secretary of Agriculture and Environment of Faxinalzinho in the Reforestation Program of HPP Monjolinho (Alzir dos Santos Antunes), establishing that, in the moment of production and supply of native seedlings to be planted in the area of the entrepreneurship's direct influence, it will be supplied to the Secretary of Agriculture and Environment native seedlings to be supplied to farmers in the interior of the city.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

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

Annex 3

BASELINE INFORMATION

Since 2006, the MCT in cooperation with the MME and ONS, started to make available the calculation methodology for CO_2 emission factor for grid-connected electricity generation in the Brazilian National Interconnected System using dispatch data analysis. The emission factor started to be widespread for each Subsystem of Brazilian Interconnected System.

In May 2008, the Designated National Authority of CDM in Brazil defined that the National Interconnected System must be considered as a unique System and, this way, this configuration started to be valid for calculating the emission factor of CO_2 used to calculate the emission reduction of greenhouse gases for CDM Projects of electricity generation connected to the grid.

The calculation of emission factor of CO_2, published by CIMGC, follows the methodological tool "Tool to calculate the emission factor for an electricity system" approved by the CDM Executive Board.

The tables below present the values considered to calculate the operating margin emission factor ($EF_{grid,OM,y}$) and the build margin emission factor ($EF_{grid,BM,y}$) which were used for Monjolinho Project *ex-ante* estimation of emission reductions. All of these data were provided by the Brazilian DNA.

Table 19 – Monthly Medium Operating Margin Emission Factor of the year of 2008 - Brazilian Interconnected System

Average Emission Factor (tCO_2/MWh) - Monthly												
2008	Month											
	January	February	March	April	May	June	July	August	September	October	November	December
	0.5727	0.6253	0.5794	0.4529	0.4579	0.5180	0.4369	0.4258	0.4102	0.4369	0.3343	0.4686

Table 20 – Daily Medium Operating Margin Emission Factor of the year of 2008 - Brazilian Interconnected System

Average Emission Factor (tCO_2/MWh) - Daily												
2008	Month											
Day	January	February	March	April	May	June	July	August	September	October	November	Dec
1	0.6225	0.6001	0.6685	0.4961	0.3851	0.5869	0.5334	0.4344	0.3880	0.4113	0.4474	
2	0.5432	0.6409	0.6980	0.5099	0.3996	0.5213	0.5435	0.4824	0.3907	0.4289	0.3821	
3	0.4792	0.6653	0.5887	0.5058	0.4575	0.5150	0.5605	0.4475	0.4020	0.3990	0.3612	
4	0.4463	0.6730	0.5700	0.4521	0.4809	0.5506	0.5236	0.4759	0.4154	0.4617	0.3365	
5	0.5505	0.6985	0.5798	0.4800	0.5121	0.5127	0.5171	0.4874	0.3686	0.5646	0.3476	
6	0.5775	0.6715	0.5586	0.5134	0.5009	0.4737	0.5780	0.4379	0.3673	0.4651	0.3420	
7	0.5260	0.6533	0.5851	0.4045	0.4438	0.4483	0.4774	0.4181	0.4287	0.4634	0.3223	
8	0.5053	0.6567	0.6394	0.4093	0.4115	0.5707	0.4263	0.4408	0.4015	0.4600	0.2978	
9	0.5445	0.6743	0.6715	0.4301	0.3960	0.5252	0.4785	0.4390	0.3868	0.4702	0.4260	
10	0.5271	0.6830	0.6049	0.4344	0.3453	0.5384	0.4289	0.4926	0.3362	0.4627	0.2917	
11	0.5296	0.6153	0.6004	0.4192	0.3881	0.5295	0.4061	0.3937	0.3310	0.4752	0.3283	
12	0.5528	0.5831	0.5686	0.4800	0.3385	0.5010	0.4088	0.3779	0.3224	0.5227	0.3659	
13	0.6154	0.5840	0.5666	0.5174	0.3388	0.5392	0.4387	0.3733	0.4213	0.4341	0.3870	
14	0.5527	0.5809	0.5606	0.4573	0.4194	0.5419	0.3372	0.4250	0.5374	0.4386	0.3792	
15	0.5818	0.6021	0.6283	0.4502	0.4387	0.5677	0.3427	0.4420	0.4315	0.4076	0.3534	
16	0.5675	0.6560	0.6438	0.4474	0.4551	0.4800	0.4090	0.4908	0.3988	0.3806	0.3613	
17	0.5756	0.6735	0.5690	0.4281	0.4651	0.5026	0.4426	0.5351	0.4274	0.4058	0.2786	
18	0.5834	0.6125	0.5563	0.4198	0.5487	0.5002	0.4282	0.4195	0.4140	0.4501	0.2621	
19	0.6340	0.5859	0.5497	0.3945	0.4751	0.5029	0.4501	0.3954	0.4216	0.5653	0.2651	
20	0.6641	0.6220	0.5934	0.4201	0.4546	0.4955	0.4792	0.3719	0.5195	0.4770	0.2703	
21	0.6022	0.6001	0.4666	0.4125	0.4267	0.4449	0.3723	0.3801	0.5575	0.4274	0.3226	
22	0.5744	0.5912	0.5005	0.4728	0.5023	0.5446	0.3389	0.3836	0.4512	0.3978	0.3812	
23	0.5515	0.6400	0.4689	0.5213	0.5076	0.5414	0.3130	0.4304	0.4444	0.3829	0.3639	
24	0.5638	0.6595	0.5573	0.5022	0.5221	0.5339	0.3648	0.5142	0.4179	0.3829	0.3056	
25	0.5729	0.5701	0.6223	0.4923	0.5334	0.5184	0.3750	0.4637	0.3701	0.3961	0.2684	
26	0.6527	0.5796	0.6314	0.4309	0.5052	0.5175	0.4250	0.4295	0.3706	0.5032	0.3120	
27	0.6942	0.6026	0.6221	0.3751	0.5025	0.5031	0.5336	0.4073	0.4058	0.3981	0.3368	
28	0.6080	0.6286	0.5582	0.3928	0.4796	0.4665	0.4598	0.3666	0.4096	0.3917	0.3144	
29	0.6201	0.5997	0.4961	0.4463	0.4769	0.5881	0.4174	0.3350	0.4301	0.4117	0.3376	
30	0.6268		0.5213	0.4668	0.5120	0.5139	0.4201	0.3510	0.4065	0.3951	0.3186	
31	0.5785		0.5087		0.5782		0.3612	0.4152		0.4127		

The hourly average emission factors are also available at the following link: http://www.mct.gov.br/index.php/content/view/303077.html#ancora (accessed on July 2009). The operating margin emission factor is calculated for Brazilian National Interconnected System for each hour based on the value of energy dispatched by each plant, generation cost of each plant (dispatch priority), hourly exchange with neighboring subsystem and emission factors for thermoelectric plants.

The dispatch order for Brazilian Interconnected System is: hydroelectric power plants, wind, nuclear, imports from other systems in ascending order of cost, thermoelectric power plants in ascending order of generation cost.

The tables below present the data concerned to the build margin emission factor ($EF_{grid,BM,y}$) used for project ex-ante emission reduction estimation.

Table 21 – Build Margin Emission Factor of the year 2008 – National Interconnected System

Average Emission Factor (tCO_2/MWh) - Daily	
2008	
	0.1458

Source: Designated National Authority
*(*http://www.mct.gov.br/index.php/content/view/303077.html#ancora) (accessed on July 2009).

The build emission factor is the average emission factor of the most recent plants of the subsystem. This set should comprise at least 5 plants and its installed capacity should be greater than 20% of installed capacity of the subsystem.

Others information about the baseline scenario and baseline emissions are presented on item B of this PDD.

Annex 4

MONITORING INFORMATION

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

All procedures which will be used to monitor the project are described on item B.7.1 and B.7.2. Some additional information is presented below.

Some details about the CCEE Energy Measurement Process are described below:

The Commercialization Process

The Electric Power Commercialization Process takes place in accordance to the parameters that have been established by Law 10848/2004, by Decrees 5163/2004 and 5.177/2004 (which instituted CCEE) and by ANEEL's Normative Resolution 109/2004, which instituted the Electric Power Commercialization Convention.

The business relationships between the Agents members of the CCEE are predominately regulated by electric power purchase and sale agreements, and all the agreements executed between the Agents within the context of the National Interconnected System must be recorded at CCEE. Such recording includes only the parties involved, the amounts of energy and the period of effectiveness; the prices for the electric power on the agreements are not recorded at CCEE, and they are used specifically by the parties involved during their bilateral settlements.

CCEE posts the differences between what has been produced or consumed and what has been contracted. The positive or negative differences are settled on the Short Term Market and are valued according to the PLD (Price for the Settlement of Differences, from Portuguese: Preço de Liquidação das Diferenças), set weekly for each load level, and for each Subsystem, having as basis the marginal cost to operate the system, which is limited by a minimum and by a maximum price.

Measurement

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

Accounting Measurement

The National Interconnected System is represented at the CCEE through a structure made-up of the measurement of consumption and generation points, which are defined through the Electric System Modeling, and whose purpose is 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 such 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 Measurement

Aggregation (from Portuguese: 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 measurement 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 measurements taken at different actual points of the SIN.

The points of the SIN that become part of the apportionment process mentioned 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 from the measurement 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.

Electric Power Data Collection System - SCDE

The Electric Power Data Collection System - SCDE (from Portuguese: Sistema de Coleta de Dados de Energia Elétrica) is responsible for the daily collection and treatment of measurement 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 measurement data to CCEE, as well as they are able to monitor the information sent on a daily basis.

Technical specifications

When of the need of installation/adaptation of the measurement System for Billing (SMF), the constant technical requirements should be observed in the Annex 1 - technical specification of the measurements for billing of the sub module 12.2 - Installation of Measurement for Billing of the Module 12 of the Procedures of Net of ONS.

The use was authorized temporarily by ANEEL'S Authoritative Resolution no. 787, of 23/01/2007.

To establish the periodicity which the Monjolinho Project's measuring tools should be calibrated, it follows below the orientation presented in Grid Procedures Sub-Module 12.3, established by ONS.

Preventive maintenance – Meters Calibration

Source: ONS – Sub-Module 12.3 – Maintenance of the measurement system for billing

In order to make the System of Measurement for Billing - SMF effective in its operation, it is necessary periodically accomplished preventive maintenances and, when necessary, corrective maintenances in the involved agents' facilities. Inspections in SMF are also accomplished with the intention of verifying the correct operation of the devices.

The activities to be accomplished by the agents involved in the National System - SIN in the maintenances and in the inspections are described in the Enclosures 1 and 2 of this sub module.

Annex 1 of ONS Sub-Module 12.3

Activities to be accomplished in the maintenance of the System of Measurement for Billing - SMF

(a) The periodicity for the responsible agent's preventive maintenance for SMF is 2 (two) years at the most. That periodicity can be altered in function of the occurrence report observed for all facilities.

(b) The preventive maintenance can be postponed by the period of up to 2 (two) years, in case an inspection happens in the measurement point. The postponement of that maintenance starts to be applied from the inspection date.

(c) The minimum tests to which the transformers should be submitted for instruments (TI) are the following ones: imposed load and diphase with periodicity of 8 (eight) years at most.

(d) In all maintenance or meters calibration, these should be substituted by another properly programmed and calibrated, when there is not an extra device, in order to minimize the interruption in the registration's load

(e) Any changing in the relation of TI's transformation to assist the protection or any operational condition that affects the measurement circuit for billing should be previously communicated to the responsible agent. That agent should make the data registered change in the Electric Power Data Collection System - SCDE and submit it to the approval of the CCEE. After the alterations in the measurement system, the involved agents should program an inspection to restore the sealing waxes.

(f) The verification of the meters' several functions perfect operation should be accomplished, as programming, mass memory, schedule, registrations, aside reading, etc. The mass memory conformity configuration should be verified (Data Record) with the one declared by the supplier and constant on the CCEE's website.

(g) The general inspection of the SMF`s connections should be accomplished to verify the existence of eventual irregularity to affect the measurement.

(h) The meter's calibration should be made by comparative method of consumption of Wh, with artificial load, single-phase or three-phase tests, in laboratories or in the field, with patterns tracked to the National Institute of Metrology, Normalization and Industrial Quality - INMETRO.

(i) The applied tension for calibration should be equal to the meter's nominal tension.

(j) The pattern used in the calibration should be owned by the responsible agent for SMF or by a hired laboratory for the responsible agent, but, just for comparison, it can be adopted the agent's pattern that accompanies the maintenance. The standard(s) must be accomplished by their calibration certificates valid in the event period.

(k) The standards, the artificial load and the meter must, when necessary, be energized before the tests with tension and nominal current, during the necessary time - at least 30 (thirty) minutes or in agreement with the manufacturers' meters orientations and pattern - for the thermal stabilization.

(l) The minimum tests to which each meter should be submitted are the following ones: calibration with nominal load, activates, reactivates inductive and reactivates capacitive, and with small load activates, according to the ABNT 14520 or IEC 687 norms.

(m) The meter in calibration that presents mistakes out of the limits specified by the used norm should be substituted.

(n) The meter identification code supplied by CCEE should be programmed and/or verified.

(o) The currents phasorial, the tensions and the sequence's phase's studies should be accomplished before and after the maintenance.

(p) In case the connected agent's or responsible agent for SMF is late in the arrival to the place, the involved agents should wait 2 (two) hours, when, then, they should cancel the service, except for agreement among the parts regarding the awaiting period.