CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 02 - in effect as of: 1 July 2004)

CONTENTS

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

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

Rialma Companhia Energética I S/A. – Santa Edwiges I Small Hydro Power Plant – Small Scale CDM Project.

PDD version number: 08

Date (DD/MM/YYYY): 10/11/2006.

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

The primary objective of Santa Edwiges I Small Hydro Power Plant is to help meet Brazil's rising demand for energy due to economic growth and to improve the supply of electricity, while contributing to the environmental, social and economic sustainability by increasing renewable energy's share of the total Brazilian (and the Latin America and the Caribbean region's) electricity consumption.

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

Santa Edwiges I Small Hydro Power Plant consists of a run-of-river small-hydro power plant (10.1 MW), that has a small reservoir (2.52 km²) with minor environmental impact.

The region where the small hydro power plant is located is at the end of a grid, consequently it is more susceptible to blackouts. The plant will contribute with an already existing grid (from Formosa to Alvorada do Norte, from Iaciara to Alvorada do Norte and from Posse to Alvorada do Norte), relieving it. In addition, new industries will be able to come to the region where the project is located, contributing to the development of the area.

Rialma Companhia Energética I S/A is the owner of Santa Edwiges I. The company was originated from a split in Rialma S/A Centrais Elétricas Rio das Almas, in order to specifically administrate Santa Edwiges I activities.

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

The project is located in the Midwest of Brazil. It is located in the Piracanjuba River, between Mambaí, Buritinópolis and Posse, state of Goiás, at the intersection of longitude 46°12'55'' W and latitude 14°18' 46''S, about 300 Km from Brasília (Federal District).

Mambaí, Buritinópolis and Posse are cities with 5,397, 3,590 and 27,591 inhabitants respectively (IBGE, 2006). Mambaí, which is considered the poorest city in the state, has 62.36% of its population living in the urban area; in Buritinópolis 51.20% of its population live in rural area. Posse has the principal economic activity based on the commercial activities.

The Santa Edwiges I Small Hydro Power Plant Project improves the supply of electricity with clean, renewable hydroelectric power while contributing to the regional/local economic development. Small-scale hydropower run-of-river plants provide local distributed generation, in contrast with the business as usual large hydropower and natural gas fired plants built in the last 5 years, and these small-scale projects provide site-specific reliability and transmission and distribution benefits including:

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

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

It can be said that fair income distribution is achieved from job creation and an increase in people's wages, however better income distribution in the region where the Santa Edwiges I Project is located is obtained mainly from less expenditures and more income in the local municipalities. The surplus of capital that these municipalities will have could be translated into investments in education and health, which will directly benefit the local population and indirectly impact a more equitable income distribution. The lower expenditure is generated due to the fact that money will no longer be spent in the same amount to "import" electricity from other regions in the country through the grid. This money would stay in the region and be used for providing the population better services, which would improve the availability of basic needs, and avoid emigration. The local population will receive economic benefits from royalties paid to the municipalities for the water rights granted to Santa Edwiges I Small Hydro Power Plant.

A.3. Project participants:

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

Table 1 – Party(ies) and private/public entities involved in the project activity

Detailed contact information on party(ies) and private/public entities involved in the project activity listed in Annex 1.

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

The Santa Edwiges I Small Hydro Power Plant project uses water from the Piracanjuba River to generate electricity, with a 10.1 MW installed capacity. SHPP Santa Edwiges I facility contains a small dam (reservoir area 2.52 km^2), which stores water in order to generate electricity for short periods of time. Run-of-river projects do not include significant water storage, and must therefore make complete use of the water flow. A typical run-of-river scheme involves a low-level diversion dam and is usually located on swift flowing streams (Figure 1).

According to Eletrobrás (1999), run-of-river projects are defined as "the projects where the river's dry season flow rate is the same or higher than the minimum required for the turbines," as it is the case of the Santa Edwiges I Small Hydro Power Plant Project. A low-level diversion dam raises the water level in the river sufficiently to enable an intake structure to be located on the side of the river. The intake consists of a trash screen and a submerged opening with an intake gate. Water from the intake is normally taken through a pipe (called a penstock) downhill to a power station constructed downstream of the intake and at as low a level as possible to gain the maximum head on the turbine.

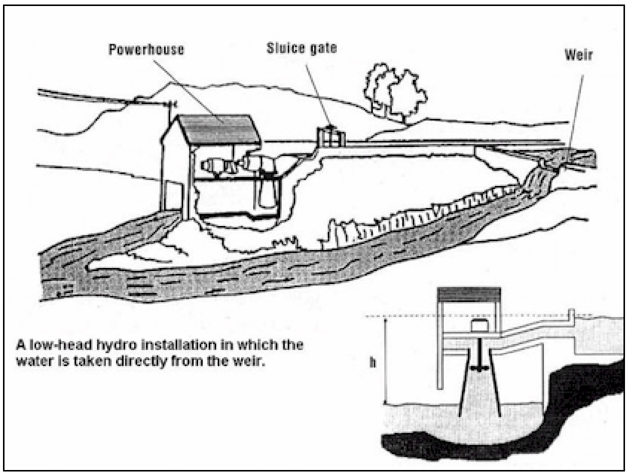

Figure 1 – Schematic view of a run-of-river power plan

Another way to characterize run-of-river power plants comes from the definition of the World Commission of Dams (WCD, 2000):

"Run-of-river dams. *Dams that create a hydraulic head in the river to divert some portion of the river flows. They have no storage reservoir or limited daily poundage. Within these general classifications there is considerable diversity in scale, design, operation and potential for adverse impacts."*

Then, to the understanding or the project participants, the Santa Edwiges I Small Hydro Power Plant can be considered a run-of-river power plant according to all the presented criteria.

The technology employed at Santa Edwiges I Small Hydro Power Plant project is established in the industry. The Francis turbine (Figure 2) is the most widely used among water turbines. In this project, the turbine is produced in Brazil with a Swedish technology that improves its efficiency. This turbine is a type of hydraulic reactor turbine in which the flow exits the turbine blades in the radial direction. Francis turbines are common in power generation and are used in applications where high flow rates are available at medium hydraulic head. Water enters the turbine through a volute casing and is directed onto the blades by wicket gates. The low momentum water then exits the turbine through a draft tube. In the model, water flow is supplied by a variable speed centrifugal pump. A load is applied to the turbine by means of a magnetic brake, and torque is measured by observing the deflection of calibrated springs. The performance is calculated by comparing the output energy to the energy supplied.

Figure 2 - Example of a Francis Turbine

(Source: HISA, http://www.hisa.com.br/produtos/turbinas/turbinas.htm)

The technology and equipment used in the project were developed and manufactured locally and has been successfully applied to similar projects in Brazil and around the world (Table 2).

Turbines	
Type	Francis
Quantity	2
Power (MW)	6.207
Water head	101 m
Generators	
Quantity	2
Frequency (Hz)	60
Nominal Power (MVA)	7
Nominal Power (MW)	6.3
Voltage (KV)	6.9

Table 2 – Specifications of the equipment used at Santa Edwiges I Small Hydro Power Plant

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

A.4.1.1. Host Party(ies):

Brazil.

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

State of Goiás (Midwest of Brazil).

A.4.1.3. City/Town/Community etc:

Mambaí, Buritinópolis and Posse.

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

The project is located in the Midwest of Brazil, state of Goiás, cities of Mambaí, Buritinópolis and Posse (latitude 14°18' 46''S and longitude 46°12'55''W) (Figure 3), and uses the hydro potential of the Piracanjuba River.

Figure 3 - Political division of Brazil showing the state of Goiás (Source: Portal Brasil, 2006) and the cities involved in the project activity (Source: City Brazil, 2006).

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

Small-scale project activity.

Type 1: Renewable energy projects.

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

Version: 9 from July 28, 2006.

Santa Edwiges I Small Hydro Power Plant uses the renewable hydro potential of the Piracanjuba River to supply electricity to a distribution system (Brazilian South-Southeast-Midwest interconnected grid) and has an installed capacity of 10.1 MW (below the eligibility limit of 15 MW for small scale projects). The equipment used in the project was developed and manufactured in Brazil.

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

Santa Edwiges I Small Hydro Power Plant, a greenhouse gas (GHG) free power generation project, will result in GHG emissions reductions as the result of the displacement of generation from fossil-fuel thermal plants that would have otherwise delivered to the interconnected grid.

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

For Santa Edwiges I Small Hydro Power Plant, the baseline emission factor is calculated as a combined margin, consisting of the operating margin and the build margin of the relevant electricity system, in accordance with the methodology ACM0002. For the purpose of determining the build margin and the operating margin emission factors, a project electricity system is defined by the spatial extent of the power plants that can be dispatched without significant transmission constraints. Similarly, a connected electricity system is defined as one that is connected by transmission lines to the project and in which power plants can be dispatched without significant transmission constraints.

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

Years	Annual estimation of emission reductions [tCO_2e]
2007 (starting in January)	13,138
2008	13,138
2009	13,138
2010	13,138
2011	13,138
2012	13,138
2013 (Until December)	13,138
Total estimated reduction (tCO_2e)	**91,968**
Total number of crediting years	7
Annual average over the crediting period of estimated reduction (tCO_2e)	13,138

Table 3 - Project Emission Reductions Estimation

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

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

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

The Santa Edwiges I Small Hydro Power Plant project is not part of a larger project activity.

SECTION B. Application of a baseline methodology:

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

Type I- Renewable Energy Projects

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

Category I.D –Renewable electricity generation for a grid.

This is a type I small-scale CDM project activity: a renewable energy project activity with a maximum output capacity equivalent to up to 15 megawatts.

The capacity of the proposed project activity is the maximum output capacity of Santa Edwiges I SHP, 10.1 MW, which will not increase beyond 15 MW.

The total installed capacity is 12.6 MW but ANEEL's resolution number 17, of April 5th, 2001 (http://www.aneel.gov.br/cedoc/res2001117.pdf) has authorized the generation of only 10.1 MW.

The baseline scenario is the continuation of the current situation of electricity supplied by large hydro and thermal power stations.

Baseline scenario
Continuation of the current situation: electricity supplied by large hydro and thermal power stations.

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

The project fulfils all the "additionality" prerequisites (see application of the "tool for the demonstration and assessment of additionality[2]", hereafter referred to simply as "additionality tool," below) demonstrating that it would not occur in the absence of the CDM.

The "additionality tool" shall be applied to describe how the anthropogenic emissions of GHG are reduced below those that would have occurred in the absence of the Santa Edwiges I Project. The additionality tool provides a general step-wise framework for demonstrating and assessing additionality. These steps, numbered from 0 to 5, include:

0. Preliminary screening
1. Identification of alternatives to the project activity
2. Investment analysis and/or
3. Barrier analysis
4. Common practice analysis
5. Impact of CDM registration

[2] *Tool for the demonstration and assessment of additionality.* UNFCCC, 28 November 2005, Version 2.

The application of the additionality tool to the Santa Edwiges I Project follows.

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

Not applicable.

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

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

To define the alternatives to the project activity, there are two-sided analysis, taking into consideration the perspective of the project owner and the perspective of the country.

From the project owner's perspective, the alternative to the project activity is the continuation of the current situation, i.e., the investment of surplus capital in the financial market.

From the country's perspective, the alternative for producing a similar amount of energy, as the one Santa Edwiges I is to provide, would be to use current generation system, which is electricity supplied by large hydro and thermal power stations. Brazil is increasingly depending on thermal plants (mainly natural gas fired).

During a period of restructuring the entire electricity market, as is the current Brazilian situation, investment uncertainty is the main barrier for small renewable energy power projects. These projects must compete with thermal plants, which usually attract the attention of financial investors.

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

Both the project activity and the alternative scenario are in compliance with all applicable regulations.

Step 2. Investment analysis
Not applicable.

Step 3. Barrier analysis

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

The considered barriers are the following:

- Lack of investment sources to finance the private sector in the country, and the high costs of the available alternatives, as indicated by the project debt structure, which is mostly dependent to the equity capital. The creation of Proinfa is a strong indication that without a financial support, investments in alternative sources of energy for power generation ambit would not be made otherwise;
- Regulatory uncertainty, once a completely new power sector regulation is under development since January 2002.

To support the barrier analysis a brief overview of the Brazilian electricity market in the last years is first presented.

Until the beginning of the 1990's, the energy sector was composed almost exclusively of state-owned companies. From 1995 on due to the increase in international interest rates and the lack of investment capacity of the State, the government was forced to look for alternatives. The solution recommended was to initiate a privatization process and the deregulation of the market.

The four pillars of the privatization process initiated in 1995 were:

- Building a competition friendly environment, with the gradual elimination of the captive consumer. The option to choose an electricity services supplier which began in 1998 for the largest consumers, and should be available to the entire market by 2006;
- Dismantling of the state monopolies, separating and privatizing the activities of generation, transmission and distribution;
- Allowing free access to the transmission lines, and
- Placing the operation and planning responsibilities to the private sector.

At the same time three entities were created, the Electricity Regulatory Agency, ANEEL set up to develop the legislation and to regulate the market; the National Electric System Operator, ONS, to supervise and control the generation, transmission and operation; and the Wholesale Electricity Market, MAE, to define rules and commercial procedures of the short-term market.

At the end of 2000, after five years of the privatization process, results were modest (Figure 4). Despite high expectations, investments in new generation did not follow the increase in consumption.

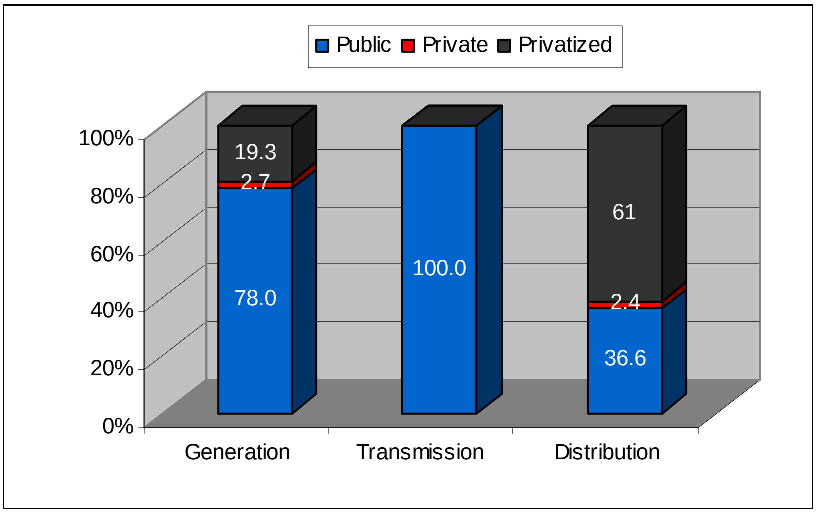

Figure 4 - Participation of private capital in the Brazilian electricity market in December 2000 (BNDES, 2000)

The decoupling of GDP (average of 2% increase in the period of 1980 to 2000) from electricity consumption increase (average of 5% increase in the same period) is well known in developing countries, mainly due to the broadening of supply services to new areas and the growing infra-structure. The necessary measures to prevent bottlenecks in services were taken. These include an increase of generation capacity higher than the GDP growth rate and strong investments in energy efficiency. In the Brazilian case, the increase in the installed generation capacity (average of 4% in the same period) did not follow the growth of consumption as can be seen in Figure 5.

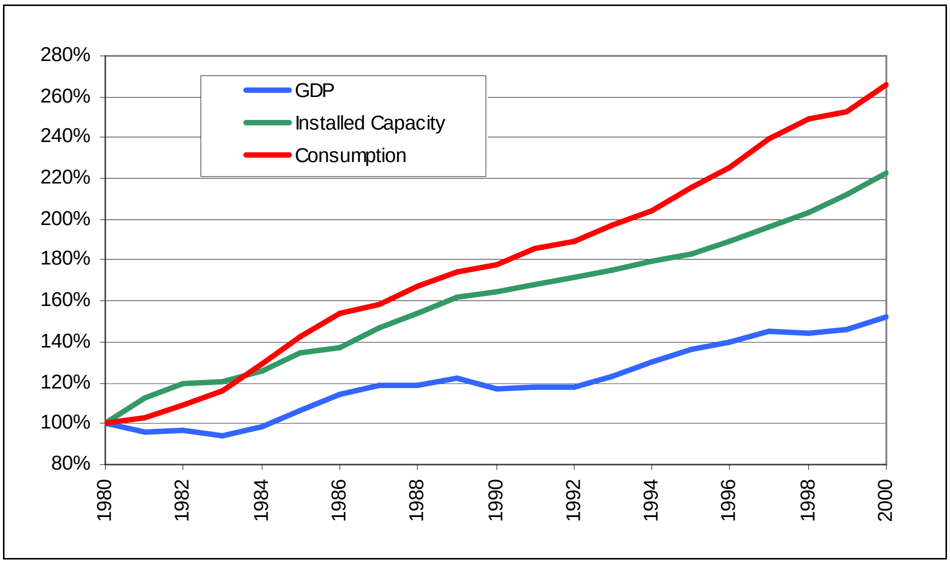

Figure 5 - Cumulated variation of GDP, electricity supply (installed capacity) and demand (consumption) (Source: Eletrobrás, http://www.eletrobras.gov.br; IBGE, http://www.ibge.gov.br/)

Without new installed capacity, the only alternatives were energy efficiency improvements or higher capacity utilization (capacity factor). Regarding energy efficiency, the government established in 1985 PROCEL (the National Electricity Conservation Program).

The remaining alternative, to increase the capacity factor of the old plants was the most widely used, as can be seen in Figure 6. To understand if such increase in capacity factor brought positive or negative consequences one needs to analyze the availability and price of fuel. In the Brazilian electricity model the primary energy source is water accumulated in the reservoirs. Figure 7 shows what has happened to the levels of “stored energy” in the reservoirs from January 1997 to January 2002. It can be seen that reservoirs which were planned to withstand 5 years of less-than-average rainy seasons, almost collapsed after a single season of low rainfall (2000/2001 experienced 74% of historical average rainfall. This situation depicts a very intensive use of the country’s hydro resources to support the increase in demand without increase of installed capacity. Under the situation described there was no long-term solution for the problems that finally caused shortage and rationing in 2001.

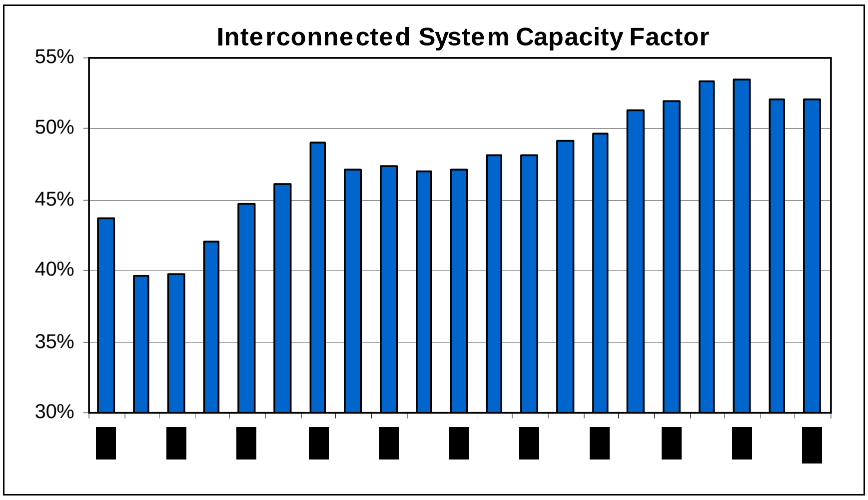

Figure 6 - Evolution of the rate of generated energy to installed capacity (Source: Eletrobrás, http://www.eletrobras.gov.br/).

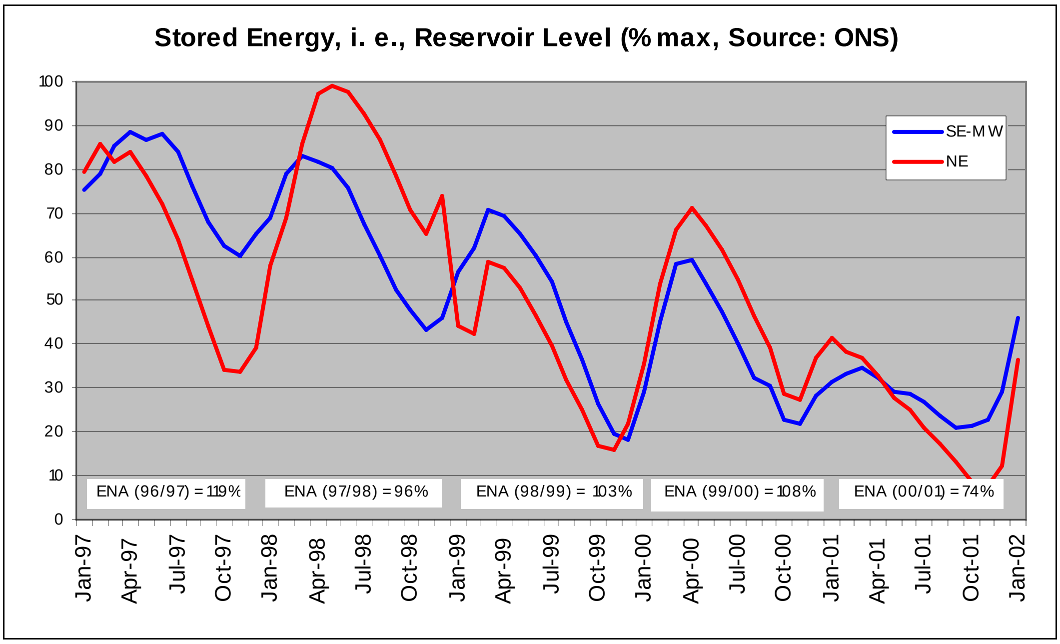

Figure 7 - Evolution of the water stored capacity for the Southeast/Midwest (SE-MW) and Northeast (NE) interconnected subsystems and intensity of precipitation in the rainy season (ENA) in the southeast region compared to the historic average (Source: ONS, http://www.ons.org.br/)

Aware of the difficulties since the end of the 1990's, the Brazilian government signalized that it was strategically important for the country to increase thermoelectric generation and consequently be less dependent of hydropower. With that in mind the federal government launched in the beginning of the year of 2000 the Thermoelectric Priority Plan (PPT, *Plano Prioritário de Termelétricas*, Federal Decree 3,371 of February 24th, 2000, and Ministry of Mines and Energy Directive 43 of February 25th, 2000), originally planning the construction of 47 thermo plants using Bolivian natural gas, totalizing 17,500 MW of new installed capacity by December of 2003. During 2001 and the beginning of 2002 the plan was reduced to 40 plants and 13,637 MW to be installed by December 2004 (Federal Law 10,438 of April 26th, 2002, Article 29). As of today, December 2004, 20 plants totalizing around 9,700 MW are operational.

During the rationing of 2001 the government also launched the Emergency Energy Program with the short-term goal of building 58 small to medium thermal power plants until by end of 2002 (using mainly diesel oil, 76,9%, and residual fuel oil, 21.1%), totalizing 2,150 MW power capacity (CGE-CBEE, 2002).

It is clear that hydroelectricity is and will continue as the main source for the electricity base load in Brazil. However, most if not all-hydro resources in the South and Southeast of the country have been exploited, and most of the remaining reserves are located in the Amazon basin, far from the industrial and population centers (OECD, 2001). Clearly, new additions to Brazil's electricity power sector are shifting from hydro to natural gas plants (Schaeffer *et al.,* 2000). With discoveries of vast reserves of natural gas in the Santos Basin in 2003 the policy of using natural gas to generate electricity remains a possibility and it will continue to generate interest from private-sector investors in the Brazilian energy sector.

In power since January 2003, the newly elected government decided to fully review the electricity market institutional framework. A new model for the electricity sector was approved by Congress in March 2004. The new regulatory framework for the electricity sector has the following key features (OECD, 2005):

- Electricity demand and supply will be coordinated through a "Pool" Demand to be estimated by the distribution companies, which will have to contract 100 per cent of their projected electricity demand over the following 3 to 5 years. These projections will be submitted to a new institution called Energy Planning Company (*Empresa de Pesquisa Energética*, EPE), which will estimate the required expansion in supply capacity to be sold to the distribution companies through the Pool. The price at which electricity will be traded through the Pool is an average of all long-term contracted prices and will be the same for all distribution companies.
- In parallel to the "regulated" long-term Pool contracts, there will be a "free" market. Although in the future, large consumers (above 10 MW) will be required to give distribution companies a 3-year notice if they wish to switch from the Pool to the free market and a 5-year notice for those moving in the opposite direction a transition period is envisaged during which these conditions will be made more flexible. If actual demand turns out to be higher than projected, distribution companies will have to buy electricity in the free market. In the opposite case, they will sell the excess supply in the free market. Distribution companies will be able to pass on to end consumers the difference between the costs of electricity purchased in the free market and through the Pool if the discrepancy between projected and actual demand is below 5%. If it is above this threshold, the distribution company will bear the excess costs.
- The government opted for a more centralized institutional set-up, reinforcing the role of the Ministry of Mines and Energy in long-term planning. EPE will submit to the Ministry its desired technological portfolio and a list of strategic and non-strategic projects. In turn, the Ministry will submit this list of projects to the National Energy Policy Council (*Conselho Nacional de Política Energética*, CNPE). Once approved by CNPE, the strategic projects will be auctioned on a priority basis through the Pool. Companies can replace the non-strategic

projects proposed by EPE, if their proposal offers the same capacity for a lower tariff. Another new institution is a committee (*Comitê de Monitoramento do Setor Elétrico*, CMSE), which will monitor trends in power supply and demand. If any problem is identified, CMSE will propose corrective measures to avoid energy shortages, such as special price conditions for new projects and reserve of generation capacity. The Ministry of Mines and Energy will host and chair this committee. No major further privatizations are expected in the sector.

Although the new model reduces market risk, its ability to encourage private investment in the electricity sector will depend on how the new regulatory framework is implemented. Several challenges are noteworthy in this regard. *First,* the risk of regulatory failure that might arise due to the fact that the government will have a considerable role to play in long-term planning should be avoided by preventing from political interference. *Second,* rules will need to be designed for the transition from the current to the new model to allow current investments to be rewarded adequately. *Third,* because of its small size, price volatility may increase in the short-term electricity market, in turn bringing about higher investment risk, albeit this risk will be attenuated by the role of large consumers. The high share of hydropower in Brazil's energy mix and uncertainty over rainfall also contribute to higher volatility of the short-term electricity market. *Fourth,* although the new model will require total separation between generation and distribution, regulations for the unbundling of vertically integrated companies still have to be defined. Distribution companies are currently allowed to buy up to 30 per cent of their electricity from their own subsidiaries (self-dealing). *Finally,* the government's policy for the natural gas sector needs to be defined within a specific sectoral framework.

Investment Barrier (Long-term funding)

In order to analyze accurately the investment environment in Brazil, the Brazilian Prime Rate, known, as SELIC rate, as well as the CDI – Interbank Deposit Certificate, which is the measure of value of value in the short-term credit market, need to be taken into account. Real interest rates have been extraordinarily high since the Real plan stabilized inflation in 1994.

As a consequence of the long period of inflation, the Brazilian currency experienced a high volatility coupled with strong devaluation, effectively precluding commercial banks from providing any long-term debt financing to local companies. The lack of a long-term debt market caused a severe negative impact on the financing of energy projects in Brazil. Real interest rates have been extraordinarily high since the Real plan stabilized inflation in 1994.

Interest rates for local currency financing are significantly higher than US Dollar rates. The National Development Bank – BNDES is the only supplier of long-term loans. Debt financing from BNDES are made primarily through commercial banks. The credit market is dominated by shorter maturities (90-days to 1-year) and long-term credit lines are available only to the strongest corporate borrowers and for special government initiatives. Credit is restricted to the short-term in Brazil or the long-term in dollars offshore.

Financial domestic markets with maturity of one year or greater practically do not exist in Brazil. Experience has shown that in moments of financial stress the duration of savings instruments contracted drops to levels close to one day with a massive concentration in overnight banking deposits. Savers do not hold long-term financial contracts due to the inability to price-in the uncertainty involved in the preservation of purchasing power value (Arida et al., 2004).

The lack of local long-term financing results from the reluctance of creditors and savers to lengthen the term of their investments. It has made savers opt for the most liquid investments and to place their money in short-term government bonds instead of investing in long-term opportunities that could finance infrastructure projects.

The most liquid government bond is the LFT (floating rate bonds based on the daily Central Bank reference rate). As of January 2004, 51.1% of the domestic federal debt was in LFTs and had duration of one day. This bond rate is almost the same as the CDI - Interbank Deposit Certificate rate that is influenced by the SELIC rate, defined by COPOM[3].

The SELIC Rate has been very volatile ranging from a minimum of 15% p.a. in January 2001 to a maximum of 45% p.a. in March 1999. Figure 8 shows SELIC Rate after January, 2004.

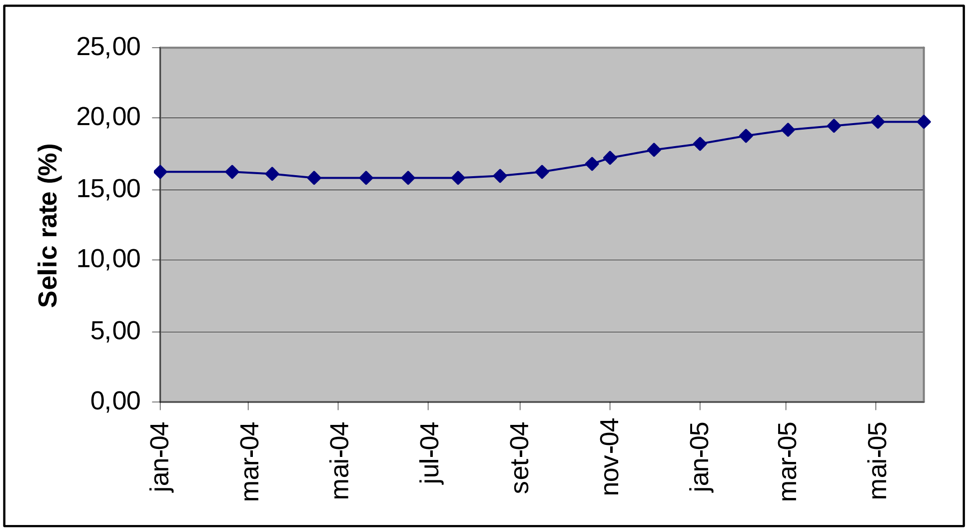

Figure 8 - SELIC rate (Source: Banco Central do Brasil, http:/www.bcb.gov.br/)

The proposed small hydro project activity is under development on a project finance basis structure. To finance construction, the project sponsor has contracted a financing line from BNDES in the amount of R$ 15 millions, with an interest rate of 13% per year for a term of 60 months and 12 months grace period, plus a working capital credit line from Unibanco in the amount of R$ 10 millions, with an interest rate of 22% per year, for a term of 24 months and 6 month grace period. These financing lines cover only 58 % of the project total costs.

The project was set up with an expected financial IRR (Internal Rate of Return) of approximately 16.38% per year, without the benefit of the CER revenues. The project's IRR is very similar to the SELIC rate in effect at the time of financing, although the project is a riskier investment as compared to Brazilian government bonds. The inclusion of the revenues from CERs makes the project's IRR increase from 16.38% to 17.46 %. Such increase in return, though small, would partially compensate for the additional risk investor would take with this project.

It is important to notice that the direct comparison between the SELIC rate and the IRR is not accurate and the idea is not to introduce a benchmark analysis, but to set a parameter as a reference.

[3] COPOM – *Comitê de Politica Monetária* (Monetary Policy Committee)

Given an energy project is a riskier investment than a government bond, it is necessary to have a much higher financial return, compared to the SELIC reference rate. Given the circumstances, rationale and distortions of the Brazilian economy, it is not straightforward to define the meaning of this difference of rates, and a developer might feel more comfortable than others, depending on the situation.

In addition, CER revenues would bring the project additional benefits due to the fact that they are generated in hard currencies (US dollar or euro). That revenue allows the project sponsor to hedge its debt cash flow against currency devaluation. Moreover, the CER Free Cash Flow, in US dollars or euro, could be discounted at an applicable discount interest rate, thus increasing the project leverage.

The high level of guarantees required to finance an energy project in Brazil is a barrier for developing new projects. Insurance, financial guarantees, financial advisories are requirements that increase the cost of the project and are barriers to the project financeability. Also, the project is generally not financed on a project finance basis, and then the developer is exposed to an extra financing risk.

Other financial barriers are related to the power purchase agreement (PPA). The PPA is required in order to obtain long-term financing from a bank and the lack of adequate commercial agreements from the energy buyers may influence directly the negotiation between the bank and the project developer. Most of the utilities in Brazil do not have a satisfactory credit risk, thus representing a barrier to obtain long-term funding.

Given the various programs and incentives which were considered along the last years, but never successfully implemented, it is easy to notice the difficulty and barriers to implement small hydro projects in the country. The first one was called PCH-COM structured by the end 2000/beginning 2001. In February/2001 the tariff was planned to be R$ 67.00/MWh, which was the reference price of the so-called "competitive power source", or the average regular power generation addition cost, but the reference market price for the PCH source at that time was around R$ 80.00/MWh. Despite of the lower tariff, the incentive relied on the PPA guarantee and the special financing source. The program was not successful because of the guarantees needed and the clauses of the contract. I.e., the project was not considered as a project finance basis and the lender demanded for direct guarantees from the developer (other than the project itself).

In April 2002, the Proinfa Law was issued to incentive the sector. During the Proinfa first Public Hearing in beginning 2003, the PCH tariff was planned to be of R$ 125.09/MWh (base June 2003, and to be escalated by the inflation index IGP-M). But on March 30th, 2004, the Ministry of Mines and Energy (MME) issued the Portaria no. 45, which set the tariff in R$ 117.02/MWh (base March 2004, and escalated by IGP-M). In January 2005, it was around R$ 129.51/MWh. In 2005, BNDES presented the last final version of its financing incentive line to Proinfa, which is different from the one first considered for the program that was not considered sufficient. It means that for the last 5 years, the government had to present a new proposition (or incentive) per year, in order to convince developers to invest in the small hydro sector.

Santa Edwiges I has a PPA with CELG - *Companhia Energética de Goiás*, not under the Proinfa Law. Its tariff is R$ 131.79/MWh (as of August/05). This PPA with CELG will be valid for 10 years. Proinfa has incentives like 20 years PPA with Eletrobrás and specific financing line with BNDES.

Due to all the difficulties exposed, and in spite of all government incentives, there are 213 approved SHP projects in Brazil[4], between 1998 and 2005, which have not started construction yet. And

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[4] Source: ANEEL - *Agência Nacional de Energia Elétrica* (Brazilian power regulatory agency).

only 1.3% of the power generated in the country comes from SHPs. The conclusion is that CDM incentives play a very important role in overcoming the above mentioned financial barriers.

Lack of Infrastructure

The regions where the projects are located are isolated and undeveloped. There is a lack of infrastructure, such as roads, reliable electricity supply, communication and transports. In addition, there were no qualified personnel available in the regions due to the lack of schools and universities.

Institutional Barrier

As described above, since 1995 government electricity market policies have been continuously changing in Brazil. Too many laws and regulations were created to try to organize and to provide incentives for new investments in the energy sector. The results of such regulatory instability were the contrary to what was trying to be achieved. During the rationing period electricity prices surpassed BRL 600/MWh (around USD 200/MWh) and the forecasted marginal price of the new energy reached levels of BR$ 120 – 150/MWh (around USD 45). In the middle of 2004 the average price was bellow BRL 50/MWh (less than USD 20/MWh). This relatively high volatility of the electricity price in Brazil, although in the short term, contributes to the difficult the analysis of the market by the developers.

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

As described above, the main alternative to the project activity is to continue the status quo. The project sponsor could invest their resources in different financial market investments. Therefore, the barriers above do not affect the investments in other opportunities. On the contrary: Brazilian interest rates, which represent a barrier for the project activity, are very attractive and a viable investment alternative.

Step 4. Common practice analysis:

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

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

One of the points to be considered when analyzing a small hydro project investment is the possibility to participate in the Proinfa Federal Government Program. Although some projects started construction independently from Proinfa, the program is considered one of the more viable financing alternatives for these projects, which will provide long-term PPAs and special financing conditions. Santa Edwiges I is not participating in the program and is addressing the market as it structures its projects.

Both process of negotiating a PPA with utility companies and obtaining funding from BNDES have proved to be very cumbersome. BNDES also requires excessive guarantees in order to provide financing. Other risks and barriers are related to the operational and technical issues associated with small hydros, including their capability to comply with the PPA contract and the potential non-performance penalties.

Regardless of the risks and barriers mentioned above, the main reason for the reduced number of similar project activities is the economic cost. Project feasibility requires a PPA contract with a utility company, but the utilities do not have the incentives or motivation to buy electricity generated by small hydro projects.

Most of the developers that funded their projects outside of Proinfa have taken CDM as decisive factor for completing their projects.

Therefore, to the best of our knowledge the vast majority of similar projects being developed in the country are participating in the Proinfa Program and not in the CDM. Nevertheless, there is no official restraint for projects derived from public policies to participate in the CDM.

The power sector suffered with more than one year (2003-2004) without regulation, and even today the legislation is not already clear for all the investors and players. The prevailing business practice in Brazil as far as obtaining financing and financial guarantees to project is a barrier to investment in renewable energy projects in the country. The access of long-term funding for renewable energy projects is difficult, mainly because of the guarantees needed and the lack of a real project finance structure. The high cost of capital in Brazil is a barrier for projects to be developed.

As an example, a quick analysis over the installation of small hydro power plants in Brazil since 2001, shows that the incentives for this source were inexistent, or rather, not effective, indicating a market/financial barrier[5]:

Installation of SHPP

Year	MW
2001	69.07
2002	51.46
2003	267.68
2004	67.79
2005	25.20 (until March)

Because of the reasons mentioned above, only 1.3% of Brazil's installed capacity comes from small hydro sources (1.2 GW out of a total of 88.7 GW). Also, from the 6,934 MW under construction in the country, only 403 MW are small hydro. In 2004, only 9 small-hydro projects, a total of just 5.22 MW, were authorized by the regulatory agency[6]. Many other projects are still under development, waiting for better investment opportunities.

Common practice in Brazil has been the construction of large-scale hydroelectric plants and, more recently, of thermal fossil fuel plants, with natural gas, which also receive incentives from the government. Already 21.3% of the power generated in the country comes from thermal power plants, and this number tends to increase in the next years, since 42% of the projects approved between 1998 and 2005 are thermal power plants (compared to only 14% of SHPs)[7].

These numbers show that incentives for the construction of thermal power plants have been more effective than those for SHPs. The use of natural gas has been increasing in Brazil since the construction of GASBOL (the Brazil-Bolivia pipeline). Besides, obtaining the licenses required by the

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[5] Source: Agência Nacional de Energia Elétrica – ANEEL (Brazilian Power Regulatory Agency).

[6] ANEEL – *Agência Nacional de Energia Elétrica* (Brazilian power regulatory agency)

[7] ANEEL – *Agência Nacional de Energia Elétrica* (Brazilian power regulatory agency)

Brazilian environmental regulation takes much longer for hydropower plants (years) than for thermal (two months).

In the most recent energy auction, which took place on December 16th, 2005, in Rio de Janeiro, 20 concessions for new power plants were granted, of which only two are for SHPs (28 MW). From the total of 3,286 MW sold, 2,247 MW (68%) will come from thermal power plants, from which 1,391 come from natural gas fired thermal power plants, i.e., 42% of the total sold[8].

In summary, this project cannot be considered common practice and therefore is not a business as usual type scenario.

And it is clear that, in the absence of the incentive created by the CDM, this project would not be the most attractive scenario.

Step 5. Impact of CDM Registration

According to the Brazilian legislation[9] small hydro power plants are hydro power plants with installed capacity greater than 1 MW and up to 30 MW, and with reservoir area of less than 3 km². Generally, it consists of a run-of-the-river hydro plant, with has a minimum environmental impact.

This is not the business-as-usual scenario in a country where large hydro and thermal fossil fuel projects are preferable. With the financial benefit derived from the CERs, it is anticipated that other project developers would benefit from this new source of revenues and would then decide to develop such projects. An increase of approximately 100 to 200 basis points, derived form CERs would be an important factor in determination to start such project.

CDM has made it possible for some investors to set up small hydro plants and sell electricity to the grid. The registration of the proposed project activity will have a strong impact in paving the way for similar projects to be implemented in Brazil.

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

The Santa Edwiges I Project boundaries are defined by the emissions targeted or directly affected by the project activities, construction and operation. It encompasses the physical, geographical site of the hydropower generation source, which is represented by the Piracanjuba River basin close to the power plant facility and the interconnected grid.

Brazil is a large country and is divided in five macro-geographical regions, North, Northeast, Southeast, South and Midwest. The majority of the population is concentrated in the regions South, Southeast and Northeast. Thus the energy generation and, consequently, the transmission are concentrated in three subsystems. The energy expansion has concentrated in three specific areas:

- Northeast: The São Francisco River basically supplies the electricity for this region. There are seven hydro power plants at the river with total installed capacity around 10.5 GW.

[8] Rosa, Luis Pinguelli. Brazilian. Newspaper "Folha de São Paulo", December 28, 2005.

[9] As defined by ANEEL Resolution no. 652, December 9th, 2003.

- South/Southeast/Midwest: The majority of the electricity generated in the country is concentrated in this subsystem. These regions also concentrate 70% of the GDP generation in Brazil. There are more than 50 hydro power plants generating electricity for this subsystem.
- North: 80% of the Northern region is supplied by diesel. However, in the city of Belém, capital of the state of Pará where the mining and aluminum industries are located, electricity is supplied by Tucuruí, the second biggest hydro plant in Brazil.

The boundaries of the subsystems are defined by the capacity of transmission. The transmission lines between the subsystems have a limited capacity and the exchange of electricity between those subsystems is difficult. The lack of transmission lines forces the concentration of the electricity generated in each own subsystem. Thus the South-Southeast-Midwest interconnected subsystem of the Brazilian grid (Figure 9) where the project activity is located is considered as a boundary.

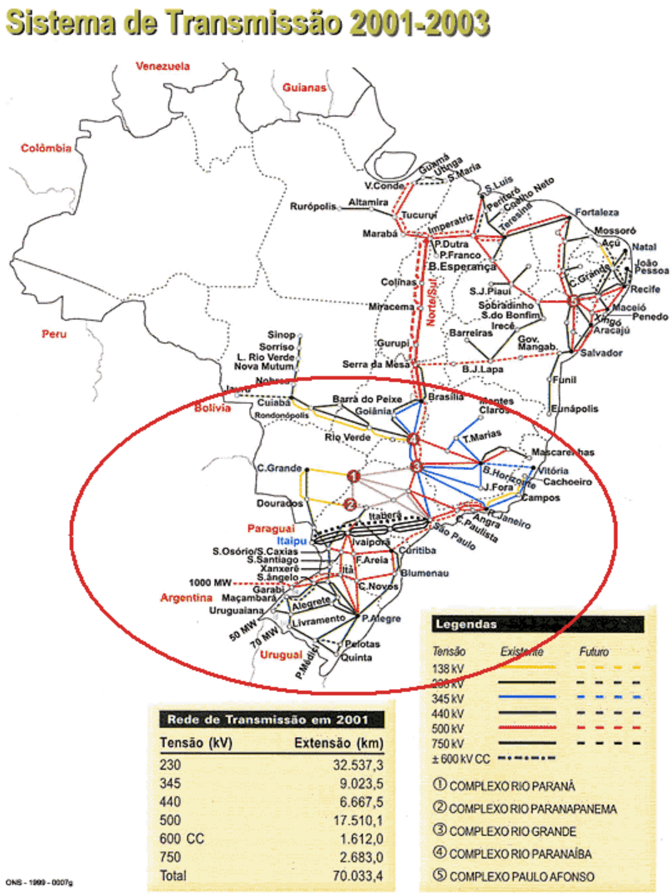

Figure 9 - Brazilian Interconnected System (Source: ONS, http://www.ons.org.br/)

Part of the electricity consumed in the country is imported from other countries. Argentina, Uruguay and Paraguay supply a very small amount of the electricity consumed in Brazil. In 2003 around 0.1% of the electricity was imported from these countries. Actually, in 2004 Brazil exported electricity to

Argentina that was in a shortage period. So the energy imported from other counties does not affect the boundary of the project and the baseline calculation.

B.5. Details of the baseline and its development:

The project will have an installed capacity of 10.1 MW, hence this is a small-scale CDM project. and the Simplified M&P for Small-Scale CDM Project Activity, Category I. D. is applicable.

According to approved methodology AMS-1.D, a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) shall be calculated in a transparent and conservative manner according to the procedures prescribed in the approved methodology ACM0002.

According to the selected approved methodology (ACM0002, version 6 from 19 May, 2006), the baseline emission factor (EF_y) is calculated as a combined margin (*CM*), consisting of the combination of operating margin (OM) and build margin (BM) factors. For the purpose of determining the build margin and the operating margin emission factors, a project electricity system is defined by the spatial extent of the power plants that can be dispatched without significant transmission constraints. Similarly a connected electricity system is defined as an electricity system that is connected by transmission lines to the project electricity system and in which power plants can be dispatched without significant transmission constraints.

From ACM0002, a baseline emission factor (*EFy*) is calculated as a combined margin (*CM*), consisting of the combination of operating margin (*OM*) and build margin (*BM*) factors according to the following three steps:

- **STEP 1 -** Calculate the operating margin emission factor(s), based on one of the following methods
  - Simple operating margin
  - Simple adjusted operating margin
  - Dispatch data analysis operating margin
  - Average operating margin.

The second alternative, simple adjusted operating margin, will be used here.

The simple adjusted operating margin emission factor ($EF_{OM,adjusted,y}$ in tCO_2/MWh) is a variation on the simple operating margin, where the power sources (including imports) are separated in low-cost/must-run power sources (*k*) and other power sources (*j*):

$$EF_{OM,simple-adjusted,y} = (1-\lambda_y)\frac{\sum_{i,j} F_{i,j,y} \cdot COEF_{i,j}}{\sum_j GEN_{j,y}} + \lambda_y \cdot \frac{\sum F_{i,k,y} \cdot COEF_{i,k}}{\sum_k GEN_{k,y}}$$

Equation 1

Where:

- λ_y is the share of hours in year *y* (in %) for which low-cost/must-run sources are on the margin.
- $\sum_{i,j} F_{i,j,y}$ is the amount of fuel *i* (in mass or volume unit) consumed by relevant power sources *j* (analogous for sources *k*) in year(s) *y*,
- $COEF_{i,j}$ is the CO_2e coefficient of fuel *i* (tCO_2e/mass or volume unit of the fuel), taking into account the carbon dioxide equivalent emission potential of the fuels used by relevant power sources *j* (analogous for sources *k*) and the percent oxidation of the fuel in year(s) *y* and,
- $\sum_{j} GEN_{j,y}$ is the electricity (MWh) delivered to the grid by source *j* (analogous for sources *k*),

- **STEP 2** – Calculate the build margin mission factor ($EF_{BM,y}$) as the generation weighted average emission factor (tCO_2e/MWh) of a sample of power plants *m*, as follows:

$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y} \cdot COEF_{i,m}}{\sum_{m} GEN_{m,y}}$$ **Equation 2**

Where $F_{i,m,y}$, $COEF_{i,m}$ and $GEN_{m,y}$ are analogous to the variables described for the simple OM method (ACM0002, 2006) for plants *m*, based on the most recent information available on plants already built . The sample group m consists of either:

- The five power plants that have been built most recently, or
- The power plants capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

Project participants should use from these two options that sample group that comprises the larger annual generation.

- **STEP 3** – Calculate the baseline emission factor EF_y, as the weighted average of the operating margin factor ($EF_{OM,y}$) and the build margin factor ($EF_{BM,y}$):

$$EF_y = w_{OM} \cdot EF_{OM,y} + w_{BM} \cdot EF_{BM,y}$$ **Equation 3**

Where the weights w_{OM} and w_{BM}, by default, are 50% (i.e., $w_{OM} = w_{OM} = 0.5$). Alternative weights can be used, as long as $w_{OM} + w_{BM} = 1$, and appropriate evidence justifying the alternative weights is presented.

The baseline emission factor is calculated in section E.1.2.4.

Date of completing the final draft of this baseline section *(DD/MM/YYYY): 26/05/2006*.

Name of person/entity determining the baseline:

Company:	Ecoinvest Carbon Brasil Ltda.
Address:	Rua Padre João Manoel, 222
Zip code + city address:	01411-000 São Paulo, SP
Country:	Brazil
Contact person:	(Mr.) Ricardo Esparta
Job title:	Director
Telephone number:	+55 (11) 3063-9068
Fax number	+55 (11) 3063-9069
Personal e-mail:	esparta@ecoinvestcarbon.com

Ecoinvest is the Project Advisor and also a Project Participant.

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

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

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

01/09/2006

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

30y-0m.

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

C.2.1. Renewable crediting period:

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

01/01/2007 (this is an estimated date)

C.2.1.2. Length of the first crediting period:

7y-0m.

C.2.2. Fixed crediting period:

Not applicable.

C.2.2.1. Starting date:

Not applicable.

C.2.2.2. Length:

Not applicable.

SECTION D. Application of a monitoring methodology and plan:

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

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

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

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

D.3 Data to be monitored:

ID number	Data type	Data variable	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For how long is archived data to be kept?	Comment
1	Electricity Generation	Electricity generation of the Project delivered to grid	MWh	M	15 minutes measurement and Monthly Recording	100%	Electronic and paper	During the credit period and two years after	The electricity delivered to the grid is monitored by the project (CER seller) and the energy buyer. Energy metering connected to the grid.
2	CO_2 emission factor	CO_2 emission factor of the grid	tCO_2/MWh	C	At the validation	0%	Electronic	During the credit period and two years after	Data will be archived according to internal procedures.
3	CO_2 emission factor	CO2 operating margin emission factor of the grid	tCO_2/MWh	C	At the validation	0%	Electronic	During the credit period and two years after	
4	CO_2 emission factor	CO2 build margin emission factor of the grid	tCO_2/MWh	C	At the validation	0%	Electronic	During the credit period and two years after	

Credit owner and project operator, the special purpose company Rialma Companhia Energética I S.A. (listed under A.3. Project participants), is author and the responsible for all activities related to the project management, registration, monitoring, measurement and reporting.

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

Data *(Indicate table and ID number e.g. 3.-1.; 3.2.)*	Uncertainty level of data (High/Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
D.3-1.	*Low*	*These data will be used for calculate the emission reductions.*
D.3-2.	*Low*	*Data does not need to be monitored*
D.3-3.	*Low*	*Data does not need to be monitored*
D.3-4.	*Low*	*Data does not need to be monitored*

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

Not applicable.

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

Company:	Ecoinvest Carbon Brasil Ltda.
Address:	Rua Padre João Manoel, 222
Zip code + city address:	01411-000 São Paulo, SP
Country:	Brazil
Contact person:	(Mr.) Ricardo Esparta
Job title:	Director
Telephone number:	+55 (11) 3063-9068
Fax number	+55 (11) 3063-9069
Personal e-mail:	esparta@ecoinvestcarbon.com

Ecoinvest is the Project Advisor and also a Project Participant.

SECTION E.: Estimation of GHG emissions by sources:

E.1. Formulae used:

E.1.1 Selected formulae as provided in appendix B:

According to the baseline methodology activities contained in Appendix B of the simplified M&P for small-scale CDM project activities, as is the case of Santa Edwiges I, emission reductions are those that result from the application of the formula mentioned in item B.5.,

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

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

According to the "Thresholds and criteria for the elegibility for the hydroelectric power plants with reservoirs as CDM project activity"[10], emissions from reservoirs, if there is any, shall be estimated considering the power density (W/m^2) of the plant.

Considering that Santa Edwiges I has installed capacity of 10.1 MW and small reservoir 2.52 km^2 its power density will be 4.01 W/m^2. In this case an emission factor of 90 gCO_2eq/kWh has to be applied. Doing so the emissions due to the reservoir of Santa Edwiges I are presented in the table bellow.

Year	Energy (MWh)	Emissions by sources (tCO_2)
Total 2007 (since January)	75,205	6,768
Total 2008	75,205	6,768
Total 2009	75,205	6,768
Total 2010	75,205	6,768
Total 2011	75,205	6,768
Total 2012	75,205	6,768
Total 2013 (until December)	75,205	6,768

Table 4 – Project activity emissions due to the reservoir

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

Not applicable (GHG emissions by the project activity are zero).

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

Year	Emissions by sources	Leakage (tCO_2)	Project Emission (tCO_2)

[10] EB 23 Report, Annex 5

	(tCO_2)		
Total 2007 (since January)	6,768	0	6,768
Total 2008	6,768	0	6,768
Total 2009	6,768	0	6,768
Total 2010	6,768	0	6,768
Total 2011	6,768	0	6,768
Total 2012	6,768	0	6,768
Total 2013 (until December)	6,768	0	6,768

Table 5 – Project activity emissions

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

According to approved methodology AMS-1.D, a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the approved methodology ACM0002.

From ACM0002, a baseline emission factor (*EFy*) is calculated as a combined margin (*CM*), consisting of the combination of operating margin (*OM*) and build margin (*BM*) factors according to the following three steps:

- **STEP 1 -** Calculate the operating margin emission factor(s), based on one of the following methods:
  - Simple operating margin
  - Simple adjusted operating margin
  - Dispatch data analysis operating margin
  - Average operating margin.

Dispatch data analysis operating margin should be the first methodological choice. Since not enough data was supplied by the Brazilian national dispatch center, the choice is not currently available. The simple operating margin can only be used where low-cost/must-run resources[11] constitute less than 50% of total grid generation in: 1) average of 5 most recent years, or 2) based on long-term normals for hydroelectricity production. Table 5 shows the share of hydroelectricity in the total electricity production for the Brazilian S-SE-CO interconnected system. However the results show the non-applicability of the simple operating margin to the Project.

Year	**Share of hydroelectricity (%)**
1999	94.0
2000	90.1
2001	86.2
2002	90.0
2003	92.9

[11] Low operating cost and must run resources typically include hydro, geothermal, wind, low-cost biomass, nuclear and solar generation (ACM0002, 2006).

Table 6 – Share of hydroelectricity production in the Brazilian S-SE-CO interconnected system from 1999 to 2003 (ONS, 2004)

The fourth alternative, an average operating margin, is an oversimplification and, due to the high share of a low operating cost/must run resource (hydro), does not reflect at all the impact of the project activity in the operating margin. Therefore, the simple adjusted operating margin will be used here.

The simple adjusted operating margin emission factor ($EF_{OM,adjusted,y}$ in tCO_2/MWh) is a variation on the simple operating margin, where the power sources (including imports) are separated in low-cost/must-run power sources (*k*) and other power sources (*j*):

$$EF_{OM,simple-adjusted,y} = (1-\lambda_y)\frac{\sum_{i,j} F_{i,j,y} \cdot COEF_{i,j}}{\sum_j GEN_{j,y}} + \lambda_y \cdot \frac{\sum F_{i,k,y} \cdot COEF_{i,k}}{\sum_k GEN_{k,y}}$$ **Equation 4**

Where:

- λ_y is the share of hours in year *y* (in %) for which low-cost/must-run sources are on the margin.
- $\sum_{i,j} F_{i,j,y}$ is the amount of fuel *i* (in mass or volume unit) consumed by relevant power sources *j* (analogous for sources *k*) in year(s) *y*,
- $COEF_{i,j}$ is the CO_2e coefficient of fuel *i* (tCO_2e/mass or volume unit of the fuel), taking into account the carbon dioxide equivalent emission potential of the fuels used by relevant power sources *j* (analogous for sources *k*) and the percent oxidation of the fuel in year(s) *y* and,
- $\sum_j GEN_{j,y}$ is the electricity (MWh) delivered to the grid by source *j* (analogous for sources *k*).

The most recent numbers for the interconnected S-SE-CO system were obtained from the Brazilian national dispatch center, ONS - *Operador Nacional do Sistema Elétrico,* in the form of daily consolidated reports (ONS-ADO, 2004). Data from 120 power plants, comprising 63.6 GW installed capacity and around 828 TWh electricity generation over the 3-year period were considered. With the numbers from ONS, Equation 4 is calculated, as described below:

$$EF_{OM,y} = \frac{\sum_{i,j} F_{i,j,y} \cdot COEF_{i,j}}{\sum_j GEN_{j,y}}$$ **Equation 5**

Where:

- $EF_{OM,y}$ is the simple operating margin emission factor (in tCO_2/MWh), or the emission factor for low-cost/must-run resources by relevant power sources *j* in year(s) *y*.

Low-cost/must-run resources in Brazilian S-SE-CO interconnected system are hydro and thermonuclear power plants, considered free of greenhouse gases emissions, i.e., $COEF_{i,j}$ for these plants is zero. Hence, the emission factor for low-cost/must-run resources results, $EF_{OM,y} = 0$.

$$EF_{OM-non,y} = \frac{\sum_{i,k} F_{i,k,y} \cdot COEF_{i,k}}{\sum_{k} GEN_{j,k}}$$ **Equation 6**

Where:

- $EF_{OM\text{-}non,y}$ is emission factor for **non**-low-cost/must-run resources(in tCO_2/MWh) by relevant power sources *k* in year(s) *y*.

Non-low-cost/must-run resources in Brazilian S-SE-CO interconnected system are thermo power plants burning coal, fuel oil, natural gas and diesel oil. These plants result in non-balanced emissions of greenhouse gases, calculated as follows:

The product $\sum_{i,k} F_{i,k,y} \cdot COEF_{i,k}$ for each one of the plants was obtained from the following formulae:

$$F_{i,k,y} = \frac{GEN_{i,k,y} \cdot 3{,}6 \times 10^{-6}}{\eta_{i,k,y} \cdot NCV_i}$$ **Equation 7**

$$COEF_{i,k} = NCV_i \cdot EF_{CO2,i} \cdot 44/12 \cdot OXID_i$$ **Equation 8**

$$Hence,\ F_{i,k,y} \cdot COEF_{i,k} = \frac{GEN_{i,k,y} \cdot EF_{CO2,i} \cdot OXID_i \cdot 44/12 \cdot 3{,}6 \times 10^{-6}}{\eta_{i,k,y}}$$ **Equation 9**

Where variable and parameters used are:

- $\sum_{i,j} F_{i,j,y}$ is given in [kg], $COEF_{i,j}$ in [tCO_2e/kg] and $F_{i,k,y} \cdot COEF_{i,k}$ in [tCO_2e]
- $GEN_{i,k,y}$ is the electricity generation for plant *k*, with fuel *i*, in year *y*, obtained from the ONS database, in MWh
- $EF_{CO2,i}$ is the emission factor for fuel *i*, obtained from the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, in tC/TJ.
- $OXID_i$ is the oxidization factor for fuel *i*, obtained from the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, in %.
- 44/12 is the carbon conversion factor, from tC to tCO_2.

- 3.6 x 10^{-6} is the energy conversion factor, from MWh to TJ.
- $\eta_{i,k,y}$ is the thermal efficiency of plant *k*, operating with fuel *i*, in year *y*, obtained from Bosi et al. (2002).
- NCV_i is the net calorific value of fuel *i* [TJ/kg].

$\sum_{k,y} GEN_{k,y}$ is obtained from the ONS database, as the summation of non-low-cost/must-run resources electricity generation, in MWh.

The λ_y factors are calculated as indicated in methodology ACM0002, with date obtained from the ONS database. Figure 10, Figure 11 and Figure 12 present the load duration curves and λ_y calculations for years 2002, 2003 and 2004, respectively. The results for years 2002, 2003 and 2004 are presented in Table 5.

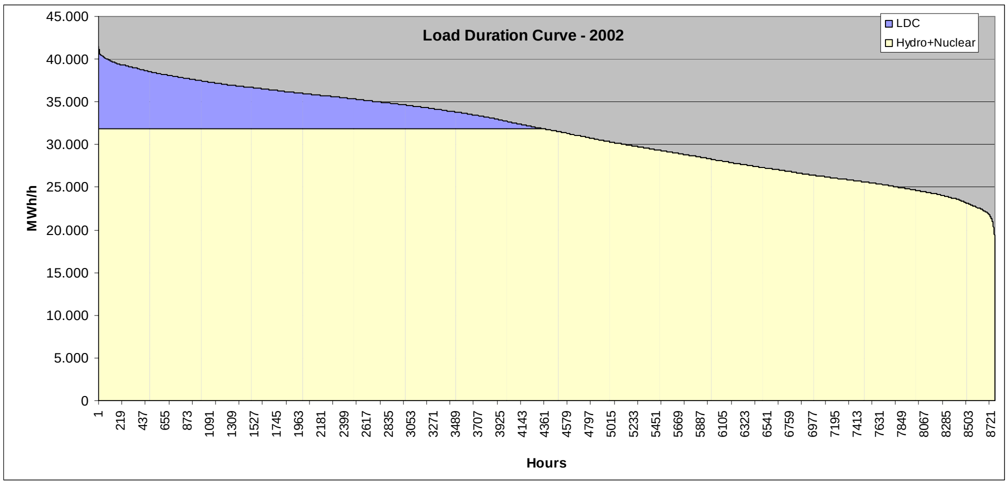

Figure 10 - Load duration curve for the S-SE-CO system, 2002

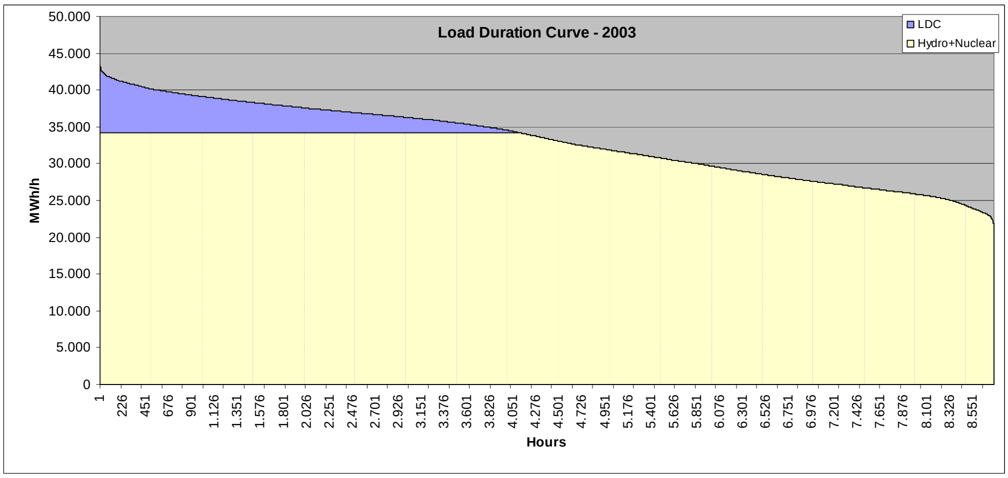

Figure 11 - Load duration curve for the S-SE-CO system, 2003

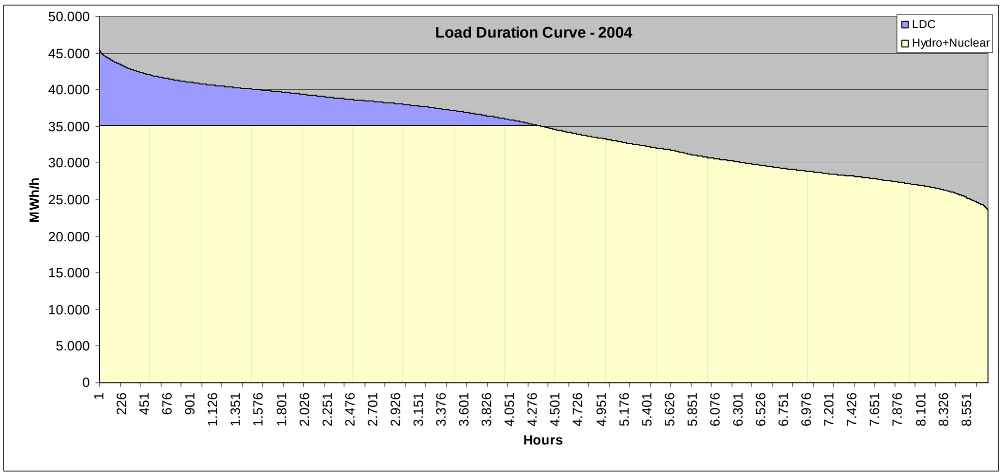

Figure 12 – Load duration curve for the S-SE-CO system, 2004

Year	$\frac{\sum_{i,k} F_{i,k,y} \cdot COEF_{i,k}}{\sum_{k} GEN_{k,y}}$ **[tCO$_2$/MWh]**	λ_y **[%]**
2002	0.8504	0.5053
2003	0.9378	0.5312
2004	0.8726	0.5041

Table 7 - Share of hours in year *y* (in %) for which low-cost/must-run sources are on the margin in the S-SE-CO system for the period 2002-2004 (ONS-ADO, 2005).

With the numbers from ONS, the first step was to calculate the lambda factors and the emission factors for the simple operating margin. The obtained values can be seen in Table 5, Figure 10, Figure 11 and Figure 12.

Finally, applying the obtained numbers to calculate $EF_{OM,simple\text{-}adjusted,2002\text{-}2004}$ as the weighted average *of* $EF_{OM,simple\text{-}adjusted\ 2002}$, $EF_{OM\ simple\text{-}\ adjusted,2003}$ *and* $EF_{OM,simple\text{-}adjusted,2004}$ and λ_y to Equation 1:

- $EF_{OM,simple\text{-}adjusted,2002\text{-}2004} = 0.4332\ tCO_2e/MWh$.

- **STEP 2** – Calculate the build margin mission factor ($EF_{BM,y}$) as the generation weighted average emission factor (tCO$_2$e/MWh) of a sample of power plants *m*, as follows:

$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y} \cdot COEF_{i,m}}{\sum_{m} GEN_{m,y}}$$ **Equation 10**

Where $F_{i,m,y}$, $COEF_{i,m}$ and $GEN_{m,y}$ are analogous to the variables described for the simple OM method (ACM0002, 2006) for plants *m*, based on the most recent information available on plants already built. The sample group m consists of either:

- The five power plants that have been built most recently, or
- The power plants capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

Project participants should use from these two options that sample group that comprises the larger annual generation.

Applying the data from the Brazilian national dispatch center to Equation 2:

- $EF_{BM,2004}$ *= 0.0962 tCO_2e/MWh.*

As per ACM0002 methodology project participants had chosen option 1, which is calculating the Build Margin emission factor $EF_{BM,y}$ ex-ante.

- **STEP 3** – Calculate the baseline emission factor EF_y, as the weighted average of the operating margin factor ($EF_{OM,y}$) and the build margin factor ($EF_{BM,y}$):

$$EF_y = w_{OM} \cdot EF_{OM,y} + w_{BM} \cdot EF_{BM,y}$$ **Equation 11**

Where the weights w_{OM} and w_{BM}, by default, are 50% (i.e., $w_{OM} = w_{OM} = 0.5$). With these numbers:

$$EF_y = 0.5 \times 0.4332 + 0.5 \times 0.0962$$

- EF_y *= 0.2647 tCO_2e/MWh.*

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

Monitored project power generation	(MWh)	(A)
Baseline emission rate factor	(tCO_2/MWh)	(B)
(A) x (B)	(tCO_2)	

The National Dispatch Center (*Operador Nacional do Sistema Elétrico, Centro Nacional de Operação do Sistema, Acompanhamento Diário da Operação do Sistema Iterligado Nacional*, daily reports from Jan. 1, 2002 to Dec. 31, 2004) supplied the raw dispatch data for the whole Brazilian interconnected grid. The following data sources were relevant for the calculation of the baseline:

- The Brazilian electricity system has been historically divided into two subsystems: the North-Northeast (N-NE) and the South-Southeast-Midwest (S-SE-CO). This is due mainly to the historical evolution of the physical system, which was naturally developed nearby the biggest consuming centers of the country.

The natural evolution of both systems is increasingly showing that integration is to happen in the future. In 1998, the Brazilian government was announcing the first leg of the interconnection line between S-SE-CO and N-NE. With investments of around US$700 million, the connection had the main purpose, in the government's view, at least, to help solve energy imbalances in the country: the S-SE-CO region could supply the N-NE in case it was necessary and vice-versa.

Nevertheless, even after the interconnection had been established, technical papers still divided the Brazilian system in two (Bosi, 2000):

"… where the Brazilian Electricity System is divided into three separate subsystems:

(i) The South/Southeast/Midwest Interconnected System;

(ii) The North/Northeast Interconnected System; and

(iii) The Isolated Systems (which represent 300 locations that are electrically isolated from the interconnected systems)"

Moreover, Bosi (2000) gives a strong argumentation in favor of having so-called *multi-project baselines*:

"For large countries with different circumstances within their borders and different power grids based in these different regions, multi-project baselines in the electricity sector may need to be disaggregated below the country-level in order to provide a credible representation of 'what would have happened otherwise".

Finally, one has to take into account that even though the systems today are connected, the energy flow between N-NE and S-SE-CO is heavily limited by the transmission lines capacity. Therefore, only a fraction of the total energy generated in both subsystems is sent one way or another. It is natural that this fraction may change its direction and magnitude (up to the transmission line's capacity) depending on the hydrological patterns, climate and other uncontrolled factors. But it is not supposed to represent a significant amount of each subsystem's electricity demand. It has also to be considered that only in 2004 the interconnection between SE and NE was concluded, i.e., if project proponents are to be coherent with the generation database they have available as of the time of the PDD submission for validation, a situation where the electricity flow between the subsystems was even more restricted is to be considered.

The Brazilian electricity system nowadays comprises of around 91.3 GW of installed capacity, in a total of 1,420 electricity generation enterprises. From those, nearly 70% are hydropower plants, around 10% are natural gas-fired power plants, 5.3% are diesel and fuel oil plants, 3.1% are biomass sources (sugarcane bagasse, black liquor, wood, rice straw and biogas), 2% are nuclear plants, 1.4% are coal plants, and there are also 8.1 GW of installed capacity in neighboring countries (Argentina, Uruguay, Venezuela and Paraguay) that may dispatch electricity to the Brazilian grid. (Aneel, 2005. http://www.aneel.gov.br/aplicacoes/capacidadebrasil/OperacaoCapacidadeBrasil.asp). This latter capacity is in fact comprised by mainly 6.3 GW of the Paraguayan part of Itaipu Binacional, a hydropower plant operated by both Brazil and Paraguay, but whose energy almost entirely is sent to the Brazilian grid.

The Small Scale Approved Methodology I.D asks project proponents to account for "all generating sources serving the system". In that way, when applying this methodology, project proponents in Brazil should search for, and research, all power plants serving the Brazilian system.

In fact, information on such generating sources is not publicly available in Brazil. The national dispatch center, ONS – *Operador Nacional do Sistema* – argues that dispatching information is strategic to the power agents and therefore cannot be made available. On the other hand, ANEEL, the electricity agency, provides information on power capacity and other legal matters on the electricity sector, but no dispatch information can be got through this entity.

In that regard, project proponents looked for a plausible solution in order to be able to calculate the emission factor in Brazil in the most accurate way. Since real dispatch data is necessary after all, the ONS was contacted, in order to let participants know until which degree of detail information could be provided. After several months of talks, plants' daily dispatch information was made available for years 2002, 2003 and 2004.

Project proponents, discussing the feasibility of using such data, concluded it was the most proper information to be considered when determining the emission factor for the Brazilian grid. According to ANEEL, in fact, ONS centralized dispatched plants accounted for 75,547 MW of installed capacity by 31/12/2004, out of the total 98,848.5 MW installed in Brazil by the same date (Aneel, 2005. http://www.aneel.gov.br/arquivos/PDF/Resumo_Gráficos_mai_2005.pdf), which includes capacity available in neighboring countries to export to Brazil and emergency plants, that are dispatched only during times of electricity constraints in the system. Therefore, even though the emission factor calculation is carried out without considering all generating sources serving the system, about 76.4% (76.4%) of the installed capacity serving Brazil is taken into account, which is a fair amount if one looks at the difficulty in getting dispatch information in Brazil. Moreover, the remaining 23.6% (23.6%) are plants that do not have their dispatch coordinated by ONS, since: either they operate based on power purchase agreements which are not under control of the dispatch authority; or they are located in non-interconnected systems to which ONS has no access. In that way, this portion is not likely to be affected by the CDM projects, and this is another reason for not taking them into account when determining the emission factor.

In an attempt to include all generating sources, project developers considered the option to research for available, but non-official data, to supply the existing gap. The solution found was the International Energy Agency database built when carrying out the study from Bosi *et al.* (2002). Merging ONS data with the IEA data in a spreadsheet, project proponents have been able to consider all generating sources connected to the relevant grids in order to determine the emission factor. The emission factor calculated was found more conservative when considering ONS data only (Table 7).

Year	$EF_{OM\ non\text{-}low\text{-}cost/must\text{-}run}$ **[tCO_2/MWh]**		EF_{BM} **[tCO_2/MWh]**	
	Ex-ante	Ex-post	Ex-ante	Ex-post
2001-2003	0.719	0.950	0.569	0.096

Table 8 – Ex ante and ex-post operating and build margin emission factors (ONS-ADO, 2004; Bosi *et al.*, 2002)

Therefore, considering all the rationale explained, project developers decided for the database considering ONS information only, as it was capable of properly addressing the issue of determining the emission factor and doing it in the most conservative way.

The aggregated hourly dispatch data got from ONS was used to determine the lambda factor for each of the years with data available (2002, 2003 and 2004). The Low-cost/Must-run generation was determined according to ACM0002, through daily dispatch data provided by ONS. The table below shows the final results for the three considered years, as well as the lambda calculated.

Emission factors for the Brazilian South-Southeast-Midwest interconnected grid				
Baseline (including imports)	EF_{OM} [tCO2/MWh]	Load [MWh]	LCMR [GWh]	Imports [MWh]
2002	0.8548	275,402,896	258,720	1,607,395
2003	0.9421	288,493,929	274,649	459,586
2004	0.8763	297,879,874	284,748	1,468,275
	Total (2002-2004) =	861,776,699	818,118	3,535,256
	$EF_{OM, simple-adjusted}$ [tCO2/MWh]	$EF_{BM,2004}$	Lambda	
	0.4332	0.0962	λ_{2002}	
	Alternative weights	Default weights	0.5053	
	w_{OM} = 0.75	w_{OM} = 0.5	λ_{2003}	
	w_{BM} = 0.25	w_{BM} = 0.5	0.5312	
	Alternative EF_{CM} [tCO2/MWh]	Default EF_{OM} [tCO2/MWh]	λ_{2004}	
	0.3490	**0.2647**	0.5041	

Table 9 – Emission factors for the Brazilian South-Southeast-Midwest interconnected grid (simple adjusted operating margin factor)

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

The emission reductions by the project activity (ER_y) during a given year *y* are the product of the baseline emissions factor (EF_y, in tCO_2e/MWh) times the electricity supplied by the project to the grid (EG_y, in MWh), minus the project emissions (PE_y) as follows:

$$ER_y = (EF_y \cdot EG_y) - PE_y$$ **Equation 12**

Since the project activity is not adding renewable energy capacity, nor a retrofit of an existing facility, *EGy* (electricity production) = *TEy* (actual electricity produced in the plant)

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

Considering a baseline of 0.2647 tCO_2e/MWh, the implementation of Santa Edwiges I project connected to the Brazilian interconnected power grid will generate an estimated annual reduction of 13,138 tCO_2e, and a total reduction of 91,968 tCO_2e over 7 years, up to and including 2013.

Installed power: 10.1 MW
Baseline interconnected: 0.2647 tCO2/MWh
Capacity factor: 85%

Year	Generation (MWh) EGy	Days of operation	tCO_2 abated	Project Emission (tCO_2)	Emission Reduction	Total tCO_2 abated (accumulated)
Total 2007 (Starting in January)	75,205	365	19,907	6,768	13,138	13,138
Total 2008	75,205	365	19,907	6,768	13,138	26,276
Total 2009	75,205	365	19,907	6,768	13,138	39,415
Total 2010	75,205	365	19,907	6,768	13,138	52,553
Total 2011	75,205	365	19,907	6,768	13,138	65,691

Total 2012	75,205	365	19,907	6,768	13,138	78,829
Total 2013 (Until December)	75,205	365	19,907	6,768	13,138	**91,968**

Table 10 – Estimated Santa Edwiges I small hydro plant project emissions reductions

SECTION F.: Environmental impacts:

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

As for the regulatory permits, Santa Edwiges I Small Hydro Power Plant has the authorization issued by ANEEL (ANEEL Resolution n° 117, issued on April 5th, 2001) to operate as an independent power producer, and a water-impound permit issued by SEMARH – *State of Goiás Environmental and Hydric Resources Agency*, on November 8th, 2005, resolution number 740/2.005-GAB.

As for the environmental permits, the proponent of any project that involves the construction, installation, expansion, and operation of any polluting or potentially polluting activity or any activity capable of causing environmental degradation is required to secure a series of permits from the respective state environmental agency. In addition, any such activity requires the preparation of an environmental assessment report, prior to obtaining construction and operation permits. Three types of permits are required. The first is the preliminary permit (*Licença Prévia* or L.P.) issued during the planning phase of the project and which contains basic requirements to be complied with during the construction, and operating stages. The second is the construction permit (*Licença de Instalação* or L.I.) and, the final one is the operating permit (*Licença de Operação* or L.O.).

The preparation of an Environmental Impact Assessment is compulsory to obtain the construction and the operation licenses. In the process a report containing an investigation of the following aspects was prepared:

- Impacts to climate and air quality.
- Geological and soil impacts.
- Hydrological impacts (surface and groundwater).
- Impacts to the flora and animal life.
- Socio-economical (necessary infra-structure, legal and institutional, etc.).

From the environmental process perspective there are two types of small hydro projects: (a) those ones that only have to prepare a Preliminary Environmental Assessment ("*Relatório Ambiental Preliminar*", RAP) and (b) those ones that have to further set up assessments called Environmental Impact Study ("*Estudo de Impacto Ambiental*", EIA.) and Environmental Impact Assessment ("*Relatório de Impacto Ambiental",* RIMA). Later on, the local environmental agency can request another assessment called Basic Environmental Project ("*Projeto Básico Ambiental*", P.B.A.) for both types of project.

In order to start the process of obtaining environmental licenses every hydro project has to confirm that the following will not occur:

- Inundation of Indian lands and slaves historical areas;
- Inundation of environmental preservation areas;
- Inundation of urban areas;
- Inundation of areas where there will be urban expansion in the foreseeable future;
- Elimination of natural patrimony;
- Expressive losses for other water uses;
- Inundation of protected historic areas; and
- Inundation of cemeteries and other sacred places.

The process starts with a previous analysis (preliminary studies) by the local environmental department. After that, if the project was considered environmentally feasible, the sponsors have to prepare the Preliminary Environmental Assessment ("*Relatório Ambiental Preliminar*" – R.A.P.), which is basically composed by the following information:

- Reasons for project implementation;
- Project description, including information regarding the reservoir and the utility;
- Preliminary Environmental Diagnosis, mentioning main biotic, and anthropic aspects;
- Preliminary estimative of project impacts; and
- Possible mitigation measures and environmental programs.

The result of a successful submission of those assessments is the preliminary license (LP), which reflects the environmental local agency positive understanding about the environmental project concepts.

To get the construction license (LI) it will be necessary to present either: (a) additional information into previous assessment; or (b) a new more detailed simplified assessment; or (c) the “Environmental Basic Project”, according environmental local agency decision at the LP issued. The operation license (LO) will be obtained as result of pre-operational tests during the construction phase, carried out to verify if all exigencies made by environmental local agency were satisfied.

The project has the necessary environmental licenses. The licenses were issued by the state environmental agency, AGMA *(Agência Goiana de Meio Ambiente)*, LO number 373/2006 was issued on July 27 th, 2006. All documents related to operational and environmental licensing are public and can be obtained at the state environmental agency (AGMA-GO).

SECTION G. Stakeholders’ comments:

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

The Brazilian resolution CONAMA 279 of June 2001 establishes that hydropower plants with less than 10 MW of installed power do not need to elaborate Environmental Impact Assessment (EIA). Santa Edwiges I Small Hydro Power Plant is a 10.1 MW hydropower plant. When it is necessary to elaborate the EIA, a public audience is also required.

However, the legislation requests the announcement of the issuance of the licenses (LP, LI and LO) in the local state official journal (*Diário Oficial do Estado*) and in the regional newspaper to make the process public and allow stakeholders’ comments.

The public audience occurred during the process involved all the cities that somehow are affected by the project such as Alvorada do Norte, Mambaí, Posse and Buritinópolis. All comments were favorable to the project, since it is going to increase people’s income and job offers.

It was also requested by the local environmental agency a Basic Environmental Project witch is being executed by Naturae Consultoria Ambiental Ltda with Mambaí’s community, and involves:

- Health and Environment Sanitation Program;
- Environmental Educational Program;
- Water Monitoring Program;
- Ictiofauna Monitoring Program;
- Rehabilitation of Degraded Areas Program;
- Cleanness of Degraded Basin Areas Program; and
- Fauna’s Rescue Program.

Besides the stakeholders comments requested for the environmental licenses, the Brazilian Designated National Authority, "*Comissão Interministerial de Mudanças Globais do Clima*", requests comments from local stakeholders, and the validation report issued by an authorized DOE according to the Resolution no. 1, issued on 11th September 2003, in order to provide the letter of approval. The Resolution determines that copies of the invitations for comments sent by the project proponents at least to the following agents involved in and affected by project activities:

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

Invitation letters were sent to the following agents (copies of the letters and post office confirmation of receipt communication are available upon request):

- *Prefeitura Municipal de Buritinópolis* (Buritinópolis City Hall)
- *Prefeitura Municipal de Mambaí* (Mambaí City Hall)
- *Prefeitura Municipal de Posse* (Posse City Hall)
- *Câmara Municipal de Buritinópolis* (Municipal Assembly of Buritinópolis)
- *Câmara Municipal de Mambaí* (Municipal Assembly of Mambaí)
- *Câmara Municipal de Posse* (Municipal Assembly of Posse)
- *Agência Ambiental de Goiás* (State of Goiás Environmental Agency)
- *Secretaria do Meio Ambiente de Buritinópolis* (Buritinópolis Environmental Agency)
- *Secretaria do Meio Ambiente de Mambaí* (Mambaí Environmental Agency)
- *Secretaria do Meio Ambiente dePosse* (Posse Environmental Agency)
- *Ministério Público do Estado de Goiás* (State Attorney for the Public Interests of the State of Goiás)
- *FBOMS – Fórum Brasileiro de ONGs e Movimentos Sociais para o Desenvolvimento e Meio Ambiente* (Brazilian Forum of NGOs and Social Movements for the Development and Environment)
- *Associação dos Pequenos Agricultores do Gerais* (Gerais Peasants Association)
- *Associação Comunitária dos Pequenos Produtores Agrícolas do Médio Nordeste Goiano* (Médio Nordeste Goiano Peasants Association)
- *Associação dos Moradores do Setor dos Funcionários de Posse*

The PDD of the project is open for comments at the validation stage in the United Nations Framework Convention on Climate Change website (http://www.unfccc.int/), since anyone can have access to the mentioned document from a legitimate source.

G.2. Summary of the comments received:

All comments in the public audience were favorable to the project once it is going to increase people's income and job offers. Since the operation permit was emitted, this is an evidence that the public audience took place and that there were no relevant comments concerning the project. Besides, no comments have been received so far regarding the invitation letters sent to the stakeholders.

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

All comments received in the licensing process were favorable, so that no due account was necessary to be taken. The project was developed as planned and following the requests made by the environmental agency and corresponding legislation.

The research paper prepared by the Santa Edwiges I Small Hydro Power Plant Project analyzing the environmental impact of the plant in the region is available upon request.

Annex 1

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding is involved in the present project.

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