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

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity

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

Title : Generation with Blast Furnace Gas of SIDERPITA (JUN1060), Brazil
Version: 03
Date : 15 July 2009

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

The project activity is power generation in a thermoelectric plant using Blast Furnace Gas (BFG) generated in pig iron production process. This activity occurs in the industrial plant of Companhia Siderúrgica Pitangui – SIDERPITA, which uses only own forest originated charcoal as production consumable in the blast furnaces for the pig iron production, thus this we can consider the BFG a renewable energy source.
This project is called Thermoelectric Plant (UTE) SIDERPITA and has a generation capacity of 5 MW.

The project is specific for SIDERPITA and is located in the municipality of Pitangui - MG.
Of the total generated power, one part shall be used for the steel plant and the remaining shall be dispatched to the Brazilian National Interconnected System (SIN).

Using the outlet gases of the 3 blast furnaces of the steel plant for electric power generation shall lead to the reduction of Greenhouse gas emissions (GHG) related to the electric power that no longer shall be imported from the grid as well as the displacement of the electric power directed to the grid.

The Project activity of SIDERPITA is helping Brazil to comply with its goals for promoting sustainable development and is also aligned with the specific requirements of the CDM (Clean Development Mechanism) of the host country, due to the following reasons:

- It contributes to environmental sustainability since it reduces the use of fossil fuel (non-renewable sources). Thus the project contributes to better utilization of natural resources and makes use of more efficient technologies;
- It contributes to better working conditions and increases employment opportunities in the area where the project is located – the new plant shall require employees for management, operation and maintenance services;
- Contributing for improvement of the local economy, since using BFG, a renewable fuel, reduces the dependence on fossil fuels, reduces the amount of associated pollution (particulates and CO) and the social costs related to the same.

Moreover, the project diversifies the sources of electricity generation and decentralizes energy generation to bring about specific advantages such as:

- Greater credibility, with shorter and less extensive interruptions;
- Fewer demands related to reserve margin;
- Better quality energy;

- Smaller losses on lines;
- Control of reactive energy;
- Mitigation of congestion in transmission and distribution.
- Reduction of peak demand in the plant and the system.

A.3. Project participants:

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) Project Participants (*) (as applicable)	Kindly indicate if the party involved wishes to be considered as project participant (Yes/No)
Brazil (Host Country)	COMPANHIA SIDERÚRGICA PITANGUI (private entity)	No
	EFFICIENTIA S.A. (public entity)	
	CARBOTRADER Assessoria e Consultoria em Energia Ltda (private entity)	
(*) In accordance with the CDM modalities and procedures, at the time of making the CDM- PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.		

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

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

A.4.1.1. Host Party(ies):

Brazil

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

Southeast Region – State of Minas Gerais (MG)

A.4.1.3. City/Town/Community etc:

City of Pitangui

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

The thermoelectric plant is located at SIDERPITA Siderurgical Plant, at 19^{0} 40’ 24’’South e 44^{0} 53’ 31’’ West, at municipality of Pitangui, Minas Gerais State, Brazilian Southeast Region.

Figure 1: Pitangui – Physical location

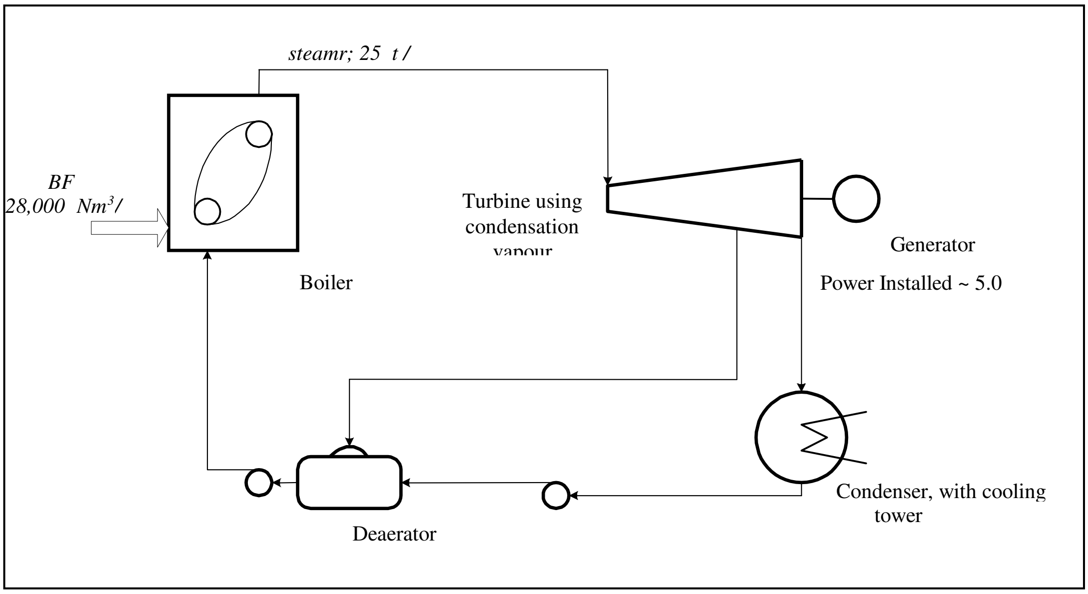
Source: City Brazil // www.citybrazil.com.br

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

Type 1 : Renewable energy project.
Category D : Renewable electricity generation for a grid.

The project aims to use the gas generated in the pig iron production process, at the industrial unit of SIDERPITA, for production of electric power in a turbo-generator.
Currently, the volume of produced blast furnace gas is partially used for pre-heating the air injected in the 3 blast furnaces of the steel plant, the non used part is burned and disposed into the atmosphere, without any use.
With the implementation of the project, the blast furnace gas used for pre-heating the air injected in the 3 blast furnaces of the steel plant will be kept for this purpose and the non used part (estimated in 40% of the total) shall be used for burning in a boiler, generating high pressure and temperature steam to be directed to a condensation turbine coupled to a generator with gross capacity of 5 MW.
The project includes the complete installation of a small thermoelectric plant (a simplified sketch is presented as follows).

Figure 2: Basic configuration of Thermoelectric Plant for Production of Energy using BFG



The production of electric power from the blast furnace gas shall be conducted according to Rankine cycle. The availability of blast furnace gas shall be 28,000 Nm^3/h, (LHV of 783 $kcal/Nm^3$) and estimating a gross efficiency of 20% for the Rankine cycle, we have:

Power (kW) = (28,000 Nm^3/h x 783 $kcal/Nm^3$ x 0.2) / 860 kcal/kWh ≈ 5,000 kW

An availability factor of 75% was considered for the turbo-generator group, including programmed and forced stoppages. This value is under the normally observed, but due to the plant size and the relative inedited project and lack of experience using blast furnace gas, a conservative index was adopted.

Thus, considering a consumption of 400kW by the thermoelectric plant, the net calorific power available for production is given by the following:

Generated Power = 4.6 MW x 0.75 x 365 days x 24 h/day = 30,222 MWh/year;

Of this, the steel plant shall consume 21.3 GWh, for an avoided demand, during the first stage, of 2.96 MW. The remaining shall be supplied to the Brazilian National Interconnected System.

A water tubular boiler was installed with a capacity of 30 t/h, absolute pressure of 34 bar, with super-heater for producing steam at a temperature of 350°C, furnace for burning blast furnace gas, condensation steam turbine with minimum yield of 74%, a generator compatible with the turbine with power of 5 MW, water condensing, electric installations for connection and protection with minimum operation life of 10 years.

The UTE installation got read in July 2007, however it´s necessary to rebuild the grid connection mechanism in order to attend the local distributor standard, so the project sponsors are implementing the new grid connection system and hope that the UTE could generate in a proper way until December 2009.

The technology and the equipment used in the project activity were developed and manufactured in Brazil not needing any transfer of know how or technology for the host country.

Table 1 - Main Datas from the Project
UTE SIDERPITA

General	
Installed Power (MW)	**5**
Fuel	**Blast Furnace Gas - BFG**
Thermodynamic cycle	**Rankine**
Fuel density (kg/m^3)	**1.36**
Fuel Input (Nm^3/h)	**35,385**
LHV (kcal/Nm^3)	**783**
Boiler	
Type	**Aquotubular**
Manufacturer	**HPB Sermatec**
Super heater Exhaust Flow (t/h)	**30**
Super heater exit pressure (kgf/cm^2)	**34**
Exhaust Temp (ºC)	**350**
Feed Water Temperature (ºC)	**105**
Fuel	**GAF**
Daily consumption (Nm^3/h)	**35,385**
Turbine	
Type	**Condensation – TMC 5000**
Manufacturer	**TGM Turbinas**
Power (kW)	**5,280**
Flow Rate (m^3/s)	**24,500**
Rotation (rpm)	**6,500**
Feed Steam	
Steam (t/h)	**27.5**
Temperature (ºC)	**350**
Pressure (bar)	**32.5**
Reheater Steam	
Steam (t/h)	**3**
Temperature (ºC)	**145**
Pressure (bar)	**4**
Exhaustion Pressure (bar)	**0.1**
Extraction Nº	**1**
Generator	
Type	**Three-phase**
Manufacturer	**Weg**
Nominal Power (kVA)	**6,250**
Effective Power (kW)	**5,000**
Nominal Voltage (V)	**13,800**
Rotation (rpm)	**1,800**
Power Factor	**0.8**
Frequency (Hz)	**60**

Table 2 - Blast Furnace Gas Composition		
Parameter Assessed	***Blast furnace 1 and 3***	***Unit***

Methane	CH_4	0.91	% volume
Carbon Dioxide	CO_2	15.84	% volume
Carbon Monoxide	CO	22.10	% volume
Hydrogen	H_2	0.00	% volume
Ethane	C_2H_6	0.04	% volume
Ethene	C_2H_5	0.04	% volume
Nitrogen	N_2	58.69	% volume
Oxygen	O_2	2.39	% volume
Higher Heating Value		795.21	kcal/Nm^3
Lower Heating Value		783.01	kcal/Nm^3

Source: average of the measured parameters for the blast furnace 1 and 3, between the years 2004 and 2005 by ECO - MB Environmental Research .

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

Year	**Estimation of annual emission Reductions in tonnes of CO_2e**
2010	**5,566**
2011	**5,566**
2012	**5,566**
2013	**5,566**
2014	**5,566**
2015	**5,566**
2016	**5,566**
2017 (June)	**2,783**
Total estimated reductions (tonnes of CO_2e)	**41,745**
Total number of crediting years	**7.5**
Annual average of the estimated reductions over the crediting period (tCO_2e)	**5,566**

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

No public funding from the Annex I Countries is involved in the present project.

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

Based on the information provided in Appendix C of the simplified modalities and procedures for small scale CDM activities, this small-scale renewable energy project is not part of a larger emission-reduction project, i.e., is not a debundled component of a larger project or program, given that this is a unique CDM project proposed by the project developer. The project participants have not registered or operated (are not therefore engaged in any way) in any other small-scale CDM project activities in thermoelectric or by using any other technologies within the project boundary, and surrounding the project boundary.

SECTION B. Application of a baseline and monitoring methodology

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

Reference : AMS I.D
Version : 13, since 14 December 2007
Title : Grid connected renewable electricity generation

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

In accordance to the list of sector scopes available on site of UNFCCC, the category in which the project is classified belongs to Sector Scope I - Energy Industries (renewable/non-renewable sources).
The project activity is applicable to type 1 of small-scale projects (renewable energy), methodology I.D. – Generation of renewable electric energy connected to grid – since it is classified in applicability requirements necessary for this category. This category encompasses renewable sources, which supply electricity to an electricity distribution system that is fed by at least one fossil fuel fired generation unit.

Renewable Energy

The charcoal consumed at SIDERPITA´s blast furnaces originates in the forested areas authorized by the competent government organs.

Charcoal is derived from a renewable raw material – eucalyptus or pines -, which has the power to clean the atmosphere by means of the photosynthetic reaction. The process is simple: during the period of forest growth, the eucalyptus or pines trees capture carbon from the atmosphere and liberate oxygen.
In the coke process, the carbon necessary for iron reduction is removed from the charcoal where it is fixed as a fossil element. During the process, impurities and polluting elements, such as sulfur, are liberated together with the carbon.
The comparison between the two energy alternatives, translated into numbers, would be: in the industrial coke process, the production of 1 ton of pig iron emits almost 1,900 kg of CO2 into the atmosphere, while the use of charcoal offers a positive balance: 1,100 kg of CO2 are removed from the atmosphere as a final result of the process (source: http://www.plantar.com.br/portal/page?_pageid=73,91181&_dad=portal&_schema=PORTAL).

The proposed project activity refers to the generation of electric power with the combustion of BFG (renewable source, as the above explanation) in a thermoelectric power plant, where part of the generated electricity shall be consumed in the industrial plant and the remaining shall be supplied to the grid, displacing the electric power produced by fuel fossil plants of the Brazilian National Interconnected System.

The installed capacity of the project activity shall be 5 MW, below the limit of 15 MW for small scale CDM projects.

B.3. Description of the project boundary:

Currently, the volume of produced blast furnace gas is partially used for pre-heating the air injected in the 3 blast furnaces of the steel plant, the non used part is burned and disposed into the atmosphere, without any use.

With the implementation of the project, the blast furnace gas used for pre-heating the air injected in the 3 blast furnaces of the steel plant will be kept for this purpose and the non used part shall be used for burning in a boiler, generating high pressure and temperature steam to be directed to a condensation turbine coupled to a generator with gross capacity of 5 MW.

As defined by the AMS I.D Method of Annex B, one of the modes and simplified procedures for small scale CDM project activities, the project limit includes the physical and geographic area of the renewable power generation source.

Here, the project limit includes the fuel intake/supply point (BFG) up to the point of directing the power to the industrial plant and the grid, where the project proposer has complete control. So, the project limit includes the UTE SIDERPITA and its main equipment: boiler, turbine and all the other equipment for power generation and direction to the industrial plant and to the national interconnected grid (as defined in the Brazilian DNA resolution).

For the effects of calculating the baseline, the national interconnected grid was included in the project limits, according to the "Tool to calculate the emission factor for an electricity system – version 01".

B.4. Description of baseline and its development:

The current Brazilian scenario shows a supplied energy grid in large part by large hydro power plants, however with an important participation of coal, fuel oil and natural gas fired thermal power plants, which jointly represent 15.9%[1] of national production. In the South-Southeast region of the country, where the main consumption centers are concentrated, the potential of hydro power production through large-scale plants is found to be practically exhausted. The absence of a system that guarantees energy reserves capable of supplying basic and emergency needs and the increasing demand for energy verified in the country, mainly in the regions mentioned above, makes it necessary to add energy production plants which, for different reasons, are frequently based on fossil fuels.

Kartha et al. (2002) state that “the central matter of the challenge of a baseline for electricity projects clearly lies in calculation the “avoided generation”, which is, what occurs without CDM or another GHG mitigation project. The fundamental point is if avoided generation is in the “**build margin**” (which is, to substitute an installation that *would have,* in another way, been constructed) and/or in the **operating margin”** (thus, that affects the *operation* of current or future plants)”.

The factor of emission from baseline is calculated with a **combined margin**, consisting of operating margin and build margin. For purposes of determining the emission factors “build margin” and “operating margin”, an electric system project is defined as the spatial extension of plants that can be dispatched without significant restrictions in transmission. In a similar way, an **interconnected electric system** is defined as any electric system that is connected by transmission lines to project, in which plants can dispatch without significant restrictions in transmission.

The methodology approved for small-scale AMS - ID - “Grid connected renewable electricity generation”, applies the increases in electricity capacity of small power plants until 15 MW, which is the proposed project activity.
The baseline scenario considers electricity that has been in a different manner generated by operation of plants connected to the grid and by addition of new generation sources.

The reduction in CO_2 emission by project activity of UTE SIDERPITA is the result of dislocation of fossil fuel fired thermal generation plants that would have been placed in the interconnected electric system in another way.
Environmentally speaking, the addition of thermoelectric power plant that uses BFG has appeared to be a very interesting option, since in addition to not producing Greenhouse Gas (GHG) emissions it is a renewable type, even presenting reduced local environmental impact.

The region of the municipality of Pitangui (State of Minas Gerais) and surrounding municipalities is supplied by the National Interconnected Electric System. Part of the electric power produced by the UTE SIDERPITA should be generated, in case of its absence, by thermal plants connected to the electric power grid using fossil fuels, increasing anthropogenic emissions. The UTE, with a final installed capacity of 5 MW, shall comply with all the project requirements for a small scale CDM.

In this context, the project activity uses as source for the calculation of the Emission Factor of the Brazilian National Interconnected System (SIN), data of the operating margin and the margin of construction provided by the Designated National Authority (DNA) of the host country.

---

[1] Information Bank of Generation (BIG) from National Electric Energy Board. 25 March 2008
http://www.aneel.gov.br/aplicacoes/capacidadebrasil/OperacaoCapacidadeBrasil.asp

The CO2 Emission Factor resulting from the generation of electric energy in the system checked in the National Interconnected System (SIN) in Brazil is calculated based on generating records from plants centrally operated by the **National Electric System Operator (ONS),** which includes thermoelectric plants that use fossil fuels as energy.

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

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

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

Further details of the development of the project baseline can be viewed through the link: http://www.mct.gov.br/index.php/content/view/71820.html.

The Carbotrader is the entity that determines the baseline according to the calculations made by its technical team, whose main responsible is:

Mr. Arthur Moraes – Carbotrader Ltda
Phone: +55 11 4522-7180
E-mail: moraes.arthur@carbotrader.com
Address: Rua Vinte e Três de Maio, 790 sala 22 A – Jundiai – SP CEP: 13.207-070

Carbotrader is the Project Advisor and also a Project Participant

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

So according to Attachment A to Appendix B of the simplified modalities and procedures for CDM small scale project activities, evidence as to why the proposed project is additional can be demonstrated by conducting a barrier analysis of the following:

(a) **Investment barrier**: This barrier evaluates a financially more viable alternative to the project activity would have led to higher emissions;

(b) **Technological barrier:** This barrier evaluates a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions;

(c) **Barrier due to prevailing practice:** This barrier evaluates prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;

(d) **Other barriers:** This barrier evaluates without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

(a) Investment barrier

For the Investment Barrier analysis two scenarios were considered:

Scenario 1 - The continuation of current practice, which is the purchase of electricity from the grid;
Scenario 2 - Implement the project activity, power generation in a thermoelectric plant using Blast Furnace Gas (BFG) generated in pig iron production process.

In the first scenario the continuation of current practices does not pose any Investment Barriers as the structure and practices necessary are already installed, requiring no further financing. Moreover, the company has always purchased electricity from the grid, and has been able to maintain high profits and increases in production.

In the second scenario for the project implementation a substantial investment is necessary. The difficulty in obtaining money for this kind of investment in Brazil comes from the fact that interest rates of financing in local currency are significantly higher than, for example, the rates in the U.S. dollars. Furthermore, the project investment is the medium to long time, which also represents a barrier facing the national scenario whose credit market is dominated by shorter maturities (of 90 days to 1 year).

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 .

The National Development Bank, BNDES, is the only supplier of long-term loans in Brazil[2]. Debt financing from BNDES is made primarily through commercial banks. But the high level of guarantees required, the high fees charged because of the risk associated with renewable projects and the purchase and sale contract of energy (CCVE) requirement, hinder access to resources by investors.

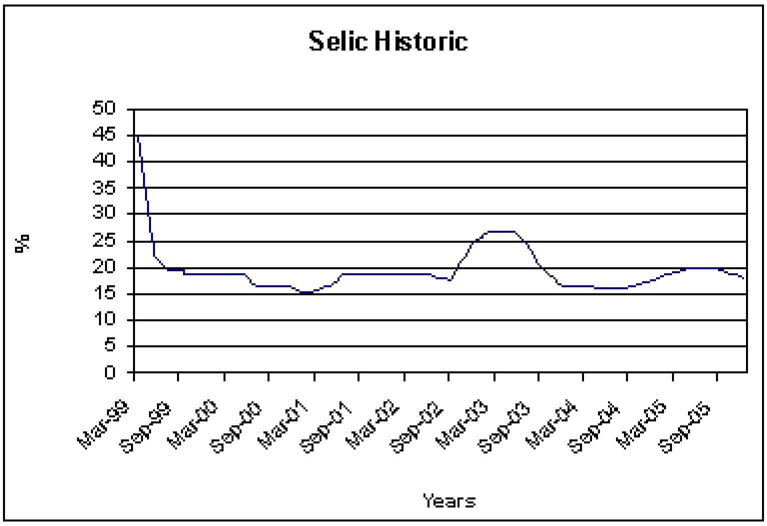
[2] According *Jennifer Hermann* in his article "Sistematização do debate sobre “Desenvolvimento e Estabilidade” no Brasil".

To incentive the alternative sources of electricity generation project investment the Brazilian government issued in April 2002 the Program of Incentive for Alternative Sources of Electricity - PROINFA. It is an important program to improve the diversifying in the national energy generation sources. The programme coordinated by the Ministry of Mines and Energy (MME) establishes the recruitment of energy in the National Interconnected System (SIN), produced by sources as wind, biomass and small hydroelectric plants. But once again, the level of guarantees required is high and many projects could not fit to obtain the benefits.
In addition to the typical uncertainties of a renewable energy project, those related to the electric market, the generation with blast furnace gas is also subject to the risks of the steel industry. The availability of blast furnace gas is directly linked to the pig iron production, and depends on the consumer market and the raw material suppliers. All these arguments demonstrate in a qualitative way the difficulties faced in the regional scenario to the investment in a renewable energy generation project using BFG as main fuel.

To analyze in a quantitative way the project barriers to investment, the Basic Rate of Interest of the Brazilian government - the SELIC rate - was established as the main comparison index (benchmark) in relation to the Internal Rate of Return (IRR) of the venture involved in this project activity.

The overnight rate of the Special System for Settlement and Custody (SELIC), expressed as annual, is the volume-weighted average rate of day financing transactions supported in federal and public securities and held in the SELIC as compromised operations. It is also the base rate used as reference for monetary policy. On the other hand, the Internal Rate of Return is one of the main indices of analysis for investment projects.
However, the SELIC rate has great uncertainty, because its oscillation has been considerable over recent years. Since the beginning of its use, it could be observed a minimum of 15.25% in January 2001 and up from 45% in March 1999 and this is demonstrated by the figure below.

Figure 3: SELIC rate historic



Source: Brazilian Central Bank - Brasil. 28 March, 2008.
http://www.bcb.gov.br/Pec/Copom/Port/taxaSELIC.asp

We can see that the SELIC rate is always more than 15% throughout the period preceding the decision-making of the project activity.

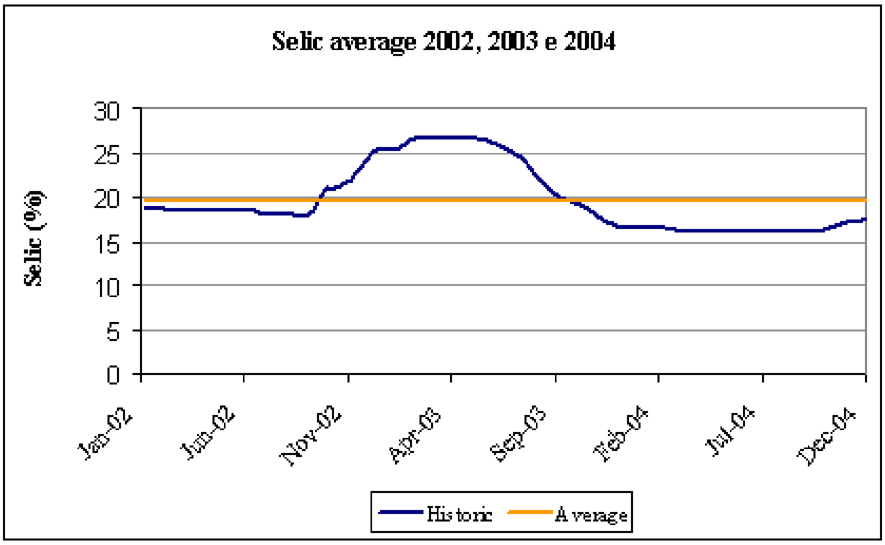
In spite of this fact allowing profitable application in public securities of the Brazilian Government, at the same it burdens the capture of resources for development of infrastructure projects, including power generations projects in Brazil.

Thus, due to the difficulties of access, small periods of shortage and high levels of guarantees required by credit institutions in the country underwent low investment in these types of project, being observed in the application market by the private equity preferably in government securities of high returns and relatively low risk.

The use of the SELIC rate as benchmark in the comparison with the internal rates of return on investments should, as conservative measure, be implemented through the average of a certain period of time. The main reason to use the average of the three years previous to the beginning of the project activity are their oscillations already demonstrated in the figure above, moreover, the average presents the general trend for this parameter in medium term.

The average SELIC rate for 2002, 2003 and 2004 is presented below.

Figure 4: SELIC rate average – 2002, 2003 and 2004



Source: Brazilian Central Bank, 28 March 2008

Considering the previous discussion, UTE SIDERPITA has an Internal Return Rate of 13.35%, which is less than the average of SELIC at the time of taking the decision to continue with the project, which was 19.56%. With the sales of CERs, the IRR shall be 14.38% per year.

Thus, we may observe that the IRR of the enterprise is lower than the average SELIC rate referring to the starting of taking the decision to continue with the project and also lower than the individualized rates.

But beyond that concrete fact, it should be noted that an energy project is an investment with greater risk than a government security. The relatively inedited project and little experience using blast furnace gas results an added risk for the investor. It needs a much larger financial return, when compared to the reference SELIC rate, so that the risks are overcome. Given these circumstances, the logic analysis and distortions of the Brazilian economy, it is not simple to define the meaning of that difference in rates and an investor may feel more comfortable that another depending on the situation.

To the project participants despite the lower return on this investment is believed that the UTE CDM certification along with the ISO 14,000 certification for the steel plant will add value to the final product of the company.

The CERs (Certified Emissions Reductions) are instruments of great importance for entrepreneurs to overcome the barriers faced when improving the quality of investment and consequently encourage future investment in other projects for generating clean energy.

(b) Technological barrier

Not used.

(c) Prevailing business practice

The common practice in Brazil has been the construction of large scale hydroelectric plants, and more recently, thermoelectric plants using fossil fuels such as natural gas, which also receive incentives from the government.
The Brazilian electric power matrix has always had the predominance of hydroelectric power generation. This clean characteristic of the electric power matrix is justified because Brazil has large hydraulic availability with potential for electric power generation. In fact, Brazil has efficiently used this hydroelectric potential, since approximately 76.4%[3] corresponds to generation by large, medium, small (SHPs) and micro hydropower plants (MHPs).

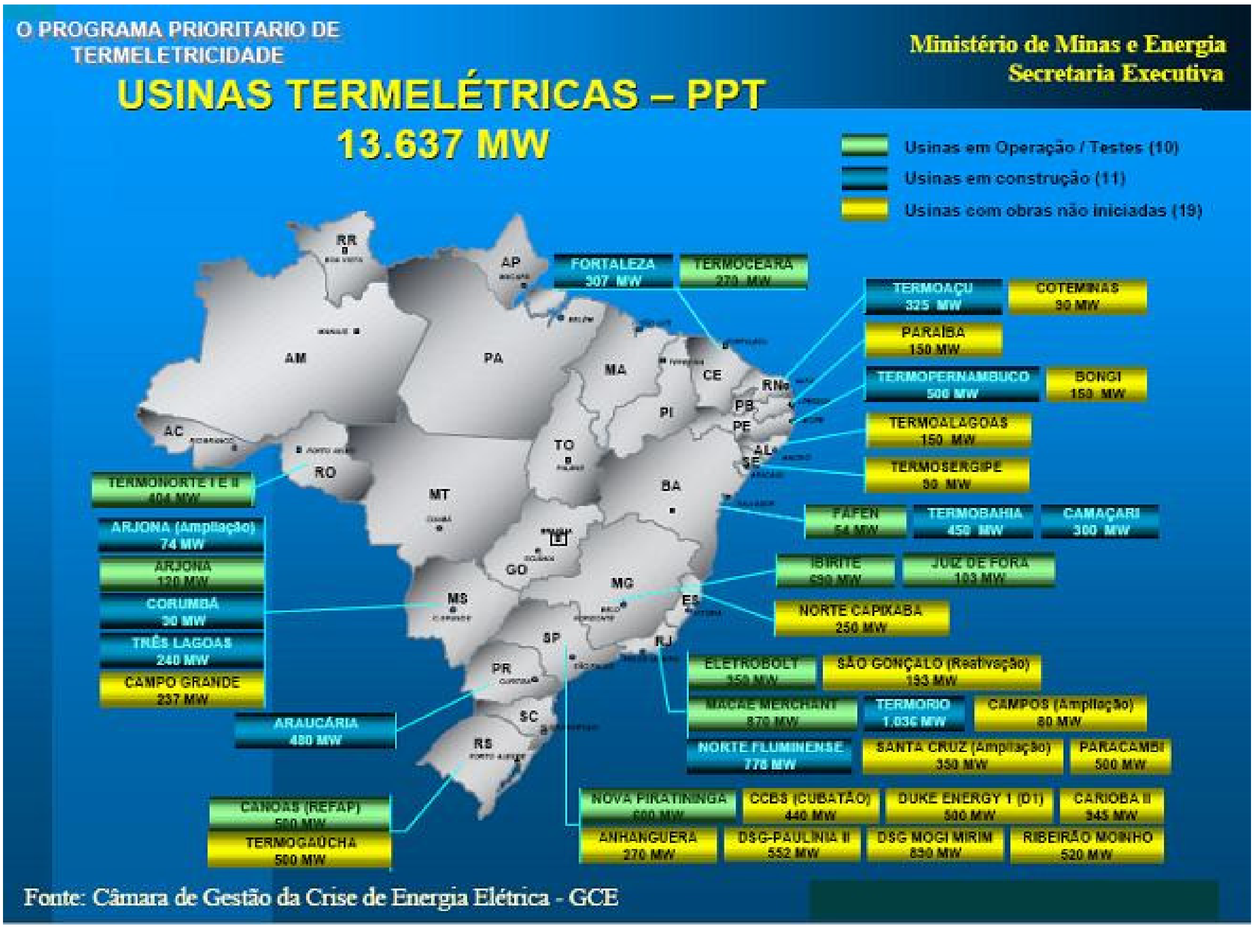
However, the composition of the Brazilian electric power matrix is undergoing changes opening space for its diversification. Considering the Brazilian economic development during the last fifteen years, Brazil needs an expansion in the generation of electric power, during the 1990s occurred large incentives for generation by thermoelectric plants and, also, large agreements and contracts with countries like Bolivia for supplying natural gas for the above mentioned intentions. Thermoelectric power plants became stronger in Brazil, particularly due to the technological evolution, increasing gas pipelines mesh and more facilities for purchasing natural gas, main fuel for this type of generating unit.

On 24 February 2000 was published the Decree No. 3.371[4], which instituted the Priority Program for Thermoelectric Power 2000-2003 (PPT), and the provisions of the Administrative Rule No. 43, of 25 February 2000 which incentives using natural gas as the main source for thermoelectric power. The Thermonuclear Plant Angra II started its operations, marking the return of the nuclear policy in Brazil.

The situation on September 2002 for thermoelectric power generation is summarized on Figure 5.

Figure 5: Thermoelectric Power Plants under operation, construction or planned in Brazil and their power.

[3] Information Bank of Generation (BIG) from National Electric Energy Board. 25 March 2008 http://www.aneel.gov.br/aplicacoes/capacidadebrasil/capacidadebrasil.asp
[4] Ministry of Mines and Energy, Ministry Office, Portaria nº 212, 25 July 2000.

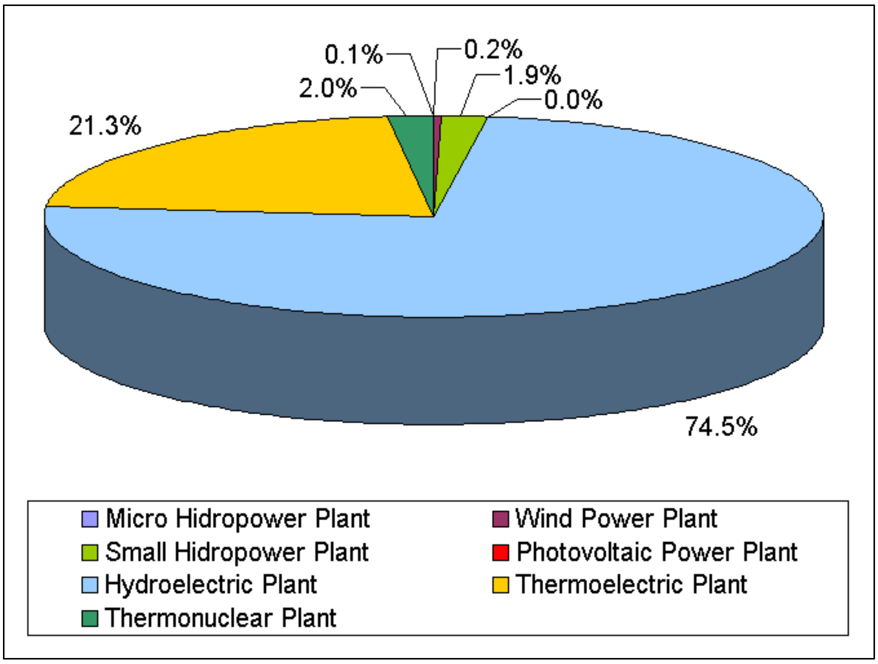


Source: Ministry of Mines and Energy (June/2002) – numbers are not in SI

During the period of 2001-2003, 10,807 MW started operations, remaining for 2004, 801 MW of thermoelectric power.

As can be seen, the mentioned diversification is occurring mainly with power generation in Thermoelectric Plants (UTE). These have been considerably increasing their participation in the context of the country, since this is the quicker solution faced with the challenges of short term compliance for the electric sector. Currently, the UTEs are responsible for approximately 21.3% of the total power production, according to figure 6.

Figure 6: Electric power generation data in Brazil from the enterprises under operation.



Source: BIG - Information Bank of Generation, 25/03/2008

Different form the thermoelectric power scenario that uses natural gas as main fuel, incentives for thermoelectric power generation from renewable or alternative sources still do not have resources, thus maintaining their complementary function in the regional scenario or in country level. Few initiatives have happened regarding thermoelectric power generation using renewable sources, since the same represent approximately 5% (5 GW – estimated number) of the Brazilian power matrix, this value corresponds mostly to generation using biomass (4.2 GW).

The project activity shall complement the efforts for development of projects for UTE generation, instead of Blast Furnace Gas (BFG). BFG is a gas with low LHV classified as "other fuel gas types". Using BFG as fuel is still insipient in Brazil (BIG - 25 March 2008). For a better example, Brazilian electric power generation is about 100,690 MW, of this total, only 186 MW corresponds to generation with BFG, i.e. less than 0.2% of the Brazilian electric power generation is obtained using BFG. Thus, we may affirm that the initiative of the project activity is out of the common practice in Brazil.

Generation enterprises from renewable sources require incentives to be implemented, this situation occurs because the generation costs are higher than the non-renewable sources. The energy from renewable sources has a environmental value aggregate that is neglected when participating in auctions among other energy types. To enhance this differential sustainable, and achieve more equitable prices, was promoted the first auction of electricity from alternative sources on 18 June 2007 by the Chamber of Electrical Energy Commercialization Ministry of Mines and Energy (CCEE), following guidelines from the Ministry of Mines and Energy (MME) and the regulation of the National Electric Power Agency (ANEEL). In the event were registered enterprises which should start the power supply 1 January 2010, classified by source of hydroelectric and other sources.

Data from the Energy Research Company (EPE)[5] show that 143 enterprises were registered in this auction, of which 24 were Wind Power Plants, 77 were Small Hydro Power Plants and 42 others were thermoelectric plants, and that none of the BFG used as fuel. One possible reason for this fact, is that the thermoelectric generation that using energy from BFG from charcoal-based pig-iron production is unusual, since that this type of enterprise is not common in commercial scale.

Thus, it is clearly demonstrated that the project activity is not the business as usual practice, since thermoelectric power generation using blast furnace residual gas is not a usual technology in Brazil. There are not many examples of this application in commercial scale generating difficulties for acquisition of equipment and qualified labor.

(d) Other barriers

In spite of being a Thermoelectric Plant, since this mode of electric power generation is widely practiced using fossil fuels (natural gas, fuel oil, diesel oil, among others), the Thermoelectric Plant of SIDERPITA is a plant fueled by a renewable gas fuel.

This fuel (BFG) comes from the charcoal burning in the blast furnaces in order to produce pig iron (main process).
The BFG used as a fuel in the thermoelectric plant is not usual in the steel plant business – due to various factors such as, the lower calorific power of the Blast Furnace Gas – the technological know how is not available for the professionals of this application sector.

The operation and maintenance of the thermal plant shall be in charge of the employees of SIDERPITA, which creates an additional risk related to the base line situation, where the power is supplied by Cemig (local energy distributor) and there is no operational risk assumed by SIDERPITA.

This represents a clear barrier for the entrepreneur due to limited information and the difficulties for absorbing a new technology with additional risks for the investment, which required Companhia Siderúrgica Pitangui to assume additional costs relative to specialized third party technical labor and also hiring expert personnel.

An important point to be mentioned is that the SIDERPITA project demanded the reassignment of human resources for development of the project activity. Training and studies were required for allowing the group of professionals of SIDERPITA to absorb the new technology and understand the equipment and process for thermal electric power generation.

Other expert Engineers and Technicians were hired to supply the company with management resources and organization capacity as necessary to allow appropriate operation and maintenance of the plant.

As a conclusion, the analysis of the above barriers shows clearly that the project activity faces barriers for **investment, barriers due to prevailing business practice and other barriers** that would have affected its development. The project developers expect to overcome these barriers with the resources of the CDM, this being indispensable for the continuity of the project activity.

[5] http://www.epe.gov.br/Lists/LeilaoFA2007/Attachments/21/Relacao_de_cadastrados_Leilao_de_FA.pdf

And so, these facts appropriately demonstrate that the project activity could not have happened in the absence of the resources of the CDM.

We may conclude that the project activity is environmentally additional and, for this reason, is selectable for receiving CERs (Certified Emission Reductions) in the CDM.

Implementation timeline of the proposed CDM project activity:

2005	
July	Project Sponsor commitment with the project activity, the contract was signed and the CDM benefits were considered in this document
2006	
October	CDM process started
2007	
March	DOE contraction process started
July	Finalization of the Thermoelectric installations The grid interconnection equipments wasn´t approved (out of the CEMIG - local energy distributor - standard)
2008	
June	PDD Publication for stakeholders comments in the UNFCCC website
2009	
December	Forecasted commercial production start and also the CDM registration A new commissioning in the interconnection equipments should be done

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

UTE SIDERPITA shall be using charcoal blast furnace gas for burning, thus, a renewable fuel and considered as neutral for carbon emissions.

We should also mention that the emissions from blast furnace gas burning are considered as neutral emissions, since they would be burned anyway if the project did not occur. There is no additional BFG burning due to the project activity. An thus:

$$PE_y = 0$$

The baseline is the MWh produced by renewable generation unit multiplied by an emission coefficient (measured in tCO_2e/MWh) calculated in a transparent and conservative manner, called combined margin (CM), which consists of a combination between the operation margin (OM) and the build margin (BM) according to procedures prescribed in the methodological tool "Tool to calculate the emission factor for an electricity system – version 01".

For the calculation of the baseline, the six steps below should be followed:

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

STEP 5. Calculate the build margin emission factor.
STEP 6. Calculate the combined margin (CM) emissions factor.

STEP 1.

A **connected electricity system**, national or international, is defined as an electricity system that is connected by transmission lines to the project electricity system. Power plants within the connected electricity system can be dispatched without significant transmission constraints but transmission to the project electricity system has significant transmission constraint.

The Designated National Authority uses the legal definition used by the ONS (National System Operator) for the SIN that defines a single electricity system in Brazil.

Furthermore the geographic and system boundaries for the relevant electricity grid can be clearly identified and information on characteristics of the grid is available due to the geographic data and the relevant electricity grid system limits are easily identified, as well as all information about the grid is available in ONS, Operador Nacional do Sistema (National System Operator), (www.ons.org.br), and in ANEEL, Agência Nacional de Energia Elétrica (National Agency of Electric Energy), (www.aneel.gov.br). More details about the Brazilian Interministerial Commission on Global Climate Change – CIMGC single system decision is available in http://www.mct.gov.br/upd_blob/0024/24834.pdf .

STEP 2.

The calculation of the Operation Margin should follow one of the four options below:

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

The methodology indicates that if possible, the analysis of the Order (c) should be the prioritized calculation method, and is therefore the option adopted in this project.

The CDM projects have two options for the use of the BM factor. It can be calculated ex-ante when the project is submitted, or ex-post for each year in which the generation of the project occurs.

STEP 3.

The dispatch data analysis OM emission factor ($EF_{grid,OM\text{-}DD,y}$) is determined based on the power units that are actually dispatched at the margin during each hour h where the project is displacing electricity. This approach is not applicable to historical data and, thus, requires annual monitoring of $EF_{grid,OM\text{-}DD,y}$.

The emission factor is calculated as follows:

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

Where:

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

The hourly emissions factor is calculated based on the energy efficiency of the power unit and the fuel type used, as follows:

$$EF_{EL,DD,h} = \frac{\sum_n EG_{n,h} \cdot EF_{EL,ny}}{\sum_n EG_{n,h}}$$

Where:

$EF_{EL,n,y}$	CO_2 emission factor of power unit n in year y (tCO_2/MWh);
$EG_{n,h}$	Net quantity of electricity generated and delivered to the grid by power unit n in hour h (MWh);
n	Power units in the top of the dispatch.

The dispatch order for a submarket is: hydroelectric plants, wind energy, nuclear energy, imports from other systems in increasing order of cost, thermoelectric plants in increasing order of generation cost.

STEP 4.

To identify which units will be included in the build margin (BM) we can consider one of the options below:

(a) The set of five power units that have been built most recently, or
(b) The set of power 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 the set of power units that comprises the larger annual generation.

STEP 5.

The build margin emissions factor ($EF_{BM,y}$) is the generation-weighted average emission factor (tCO_2/MWh) of all power units m during the most recent year y for which power generation data is available, calculated as follows:

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

Where:

$EF_{grid,BM,y}$ Build margin CO_2 emission factor in year y (tCO_2/MWh);
$EG_{m,y}$ Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh);
$EF_{EL,m,y}$ CO_2 emission factor of power unit m in year y (tCO_2/MWh);
m Power units included in the build margin.

STEP 6.

Once that operating margin emission factor and built margin emission factor were calculated, the combined margin emission factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM-DD,y} \cdot w_{OM} + EF_{grid,BM,y} \cdot w_{BM}$$

Where:

$EF_{grid,CM,y}$ Combined Margin CO_2 Emission Factor in year y (tCO_2/MWh);
$EF_{grid,OM-DD,y}$ Operating margin CO_2 emission factor in year y (tCO_2/MWh);
$EF_{grid,BM,y}$ Build margin CO_2 emission factor in year y (tCO_2/MWh);
w_{OM} Weighting of operating margin emissions factor (%);
w_{BM} Weighting of build margin emissions factor (%).

Where the weights w_{OM} and w_{BM} are default 0.5.

Baseline Emissions

$$BE_{grid} = EF_{grid,CM,y} \cdot EG_y$$

Where:

BE_{grid} are the baseline emissions in tCO_2e/year;
EG_y are the generated electricity in year y in MWh.

There aren´t energy generating equipment transferred from or to another activity, so according to the methodology the leakage is considered zero.

L_y= 0

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

Data / Parameter:	$SFC_{BFG\ used\ in\ the\ UTE}$
Data unit:	Nm3/KWh
Description:	The BFG consumption per unit of electricity generated by thermoelectric power plant (UTE Siderpita).
Source of data used:	Detailed in the project design contract and related in the support documents (spreadsheet)
Value applied:	5.435[6]
Justification of the choice of data or description of measurement methods and procedures actually applied :	For projects consuming biomass a specific fuel consumption of each type of fuel (biomass or fossil) to be used should be specified ex-ante.
Any comment:	

Data / Parameter:	$SFC_{charcoal}$
Data unit:	Kg/Nm3
Description:	The charcoal consumption per unit of Blast Furnace Gas (BFG)
Source of data used:	Detailed in the project design contract and related support documents (spreadsheet) also in the technical article "The Future of the charcoal in the steel "– free translation[7].
Value applied:	0.3625
Justification of the choice of data or description of measurement methods and procedures actually applied :	Ex-ante fuel consumption specification. In the project assumptions is considered that 40% of the total BFG produced should be available to the thermoelectric power plant (UTE Siderpita).
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

[6] Original Project Assumption 0.184 KWh/Nm3

[7] "The Future of the charcoal in the stell " – free translation. - Omar Campos Ferreira
http://www.ecen.com/eee21/emiscar2.htm
Project assumption: 2,000 Nm3 BFG are generated when 1 ton pig iron is produced.

Mass Balance (refer to the article): 1 t pig iron requires 0.725 t charcoal

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

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

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

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

For effect of *ex-ante* operation margin emission factor calculation will be used, like a good estimation to $EF_{grid,OM\text{-}DD,y}$ value, the arithmetic average of the 12 last monthly emission factors published by the DNA (ultimate datas available).
(http://www.mct.gov.br/index.php/content/view/72901.html)

Average Monthly Factor (tCO_2/MWh)												
year	2007											
month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EF	0.2292	0.1954	0.1948	0.1965	0.1606	0.2559	0.3096	0.3240	0.3550	0.3774	0.4059	0.4865

$EF_{grid,MO\text{-}DD,y} = 0.2909$

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

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

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

For the build margin emission factor $EF_{grid,BM,y}$ will be adopted the 2007 year value published by the DNA (ultimate data available).
(http://www.mct.gov.br/index.php/content/view/72901.html)

$EF_{grid,BM,y} = 0.0775$

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

Finally the baseline emission factor is calculated through a weighted-average formula, considering both the OM and the BM where default weights are 0.5 and 0.5. So, the result is:

$$EF_{grid,CM,y} = 0.2909 \cdot 0.5 + 0.0775 \cdot 0.5 = 0.1842 \quad (tCO_2/MWh)$$

The baseline emissions are proportional to the electricity delivered to the grid throughout the project's lifetime. Baseline emissions due to displacement of electricity are calculated by multiplying the electricity baseline emissions factor ($EF_{grid,CM,y}$) with the electricity generation of the project activity.

$$BE_y = EF_{grid,CM,y} . EG_y$$

Therefore, for the crediting period, the baseline emissions will be calculated as follows:

$$BE_y = 0.1842\ tCO_2/MWh\ .\ EG_y \quad (\text{in } tCO_2e)$$

The emissions reduction (ER) of this project activity is:

$$ER = BE_y - (L_y + PE_y)$$

To this project $L_y = 0$ and $PE_y = 0$

Then:

$$ER = BE_y - (L_y + PE_y) = 0.1842\ tCO_2/MWh\ .\ EG_y - 0 \rightarrow ER = 0.1842\ tCO_2/MWh\ .\ EG_y$$

$$ER = 0.1842\ .\ EG_y\ \ tCO_2$$

$$ER = 0.1842\ .\ 30{,}222 = 5{,}566\ tCO_2$$

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

Year	Estimation of project activity emissions (tCO_2e)	Estimation of Baseline emissions (tCO_2e)	Estimation of leakage (tCO_2e)	Estimation of Overall emission reductions (tCO_2e)
2010	0	5,566	0	5,566
2011	0	5,566	0	5,566
2012	0	5,566	0	5,566
2013	0	5,566	0	5,566
2014	0	5,566	0	5,566
2015	0	5,566	0	5,566
2016	0	5,566	0	5,566
2017 (June)	0	2,783	0	2,783
Total (tCO_2e)	**0**	**41,745**	**0**	**41,745**

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

B.7.1 Data and parameters monitored:

Data / Parameter:	EG_y
Data unit:	MWh
Description:	Net Electricity generated by the project in a year *y*.
Source of data to be used:	Energy Meter
Value of data	30,222
Description of measurement methods and procedures to be applied:	The net electricity displaced and/or delivered to the grid will be checked through the energy metering. The meter must comply with national standards and industrial regulations to ensure the accuracy. The meters should be sealed for safety after calibration.
QA/QC procedures to be applied:	The data from the energy meter will be cross checked with the internal meter (located in the siderurgical´s panel – electricity displaced from the grid) and with the external meter (located in the grid interconnection substation – electricity dispatched) both sealed by the CEMIG (local distributor company). To the external meter the data available in the CCEE data bank (Electric Power Commercialization Chamber in Brazil) or the energy invoice sales can provide coherency.
Any comment:	To the internal meters the class of accuracy and calibration frequency should be the specified by the Manufacturer technical equipment specifications and/or by the UTE monitoring procedures/rules. To the external meter the class of accuracy should comply with the national standards (NBR 14519 from Associação Brasileira de Normas Técnicas – Brazilian Association of Technical Standards). It can be viewed in the Grid Procedures from the National Grid Operator: Module 12, Sub-module12.2 Installation of the Measurement System for Billing in the link: http://www.ons.org.br/download/procedimentos/Submodulo%2012.2_v10.0.pdf.).

Data / Parameter:	$EF_{grid,CM,y}$
Data unit:	tCO_2/MWh
Description:	CO_2 emission factor of the grid.
Source of data to be used:	Calculated through the data provided by DNA (Designated National Authority). The brazilian DNA provides the Operating Margin Emission Factor and the Build Margin Emission Factor.
Value of data	0.1842
Description of measurement methods and procedures to be applied:	The Emission Factor will be monitored through ex-post calculation, which data are available by the DNA (Designated National Authority). The Combined Margin is calculated through a weighted-average formula, considering both the $EF_{grid,OM-DD,y}$ and the $EF_{grid,BM,y}$ and the weights w_{OM} and w_{BM} (are default 0.5).
QA/QC procedures to be applied:	This data will be applied in the project emission reductions calculation. The data will be annually filed (electronic archive and paper) and for two years after the end of project activity will be kept.

Any comment:	

Data / Parameter:	$EF_{gris,OM-DD,y}$
Data unit:	tCO_2/MWh
Description:	CO_2 Operating Margin emission factor of the grid, in a year *y*.
Source of data to be used:	Data provided by DNA.for the year y.
Value of data	0.2909
Description of measurement methods and procedures to be applied:	The Operating Margin Emission Factor, will be annually monitored in the DNA website, which is responsible for this calculation.
QA/QC procedures to be applied:	This data will be applied in *ex-post* calculation of the Emission Factor. The data will be annually filed (electronic archive and paper) and for two years after the end of project activity will be kept.
Any comment:	

Data / Parameter:	$EF_{grid,BM,y}$
Data unit:	tCO_2/MWh
Description:	CO_2 Build Margin emission factor of the grid in a year *y*.
Source of data to be used:	Data provided by DNA.for the year y.
Value of data	0.0775
Description of measurement methods and procedures to be applied:	The Build Margin Emission Factor, will be annually monitored in the DNA website, which is responsible for this calculation.
QA/QC procedures to be applied:	This data will be applied in *ex-post* calculation of the Emission Factor. The data will be annually filed (electronic archive and paper) and for two years after the end of project activity will be kept.
Any comment:	

Data / Parameter:	$Q_{BFG,y}$
Data unit:	Nm^3
Description:	Amount of waste gas used for energy generation during year *y*
Source of data to be used:	Project Participants
Value of data	178,539,750 [8]
Description of measurement methods and procedures to be applied:	Direct Measurements by project participants through an appropriate metering device (flow meter witch values should be registered by the control and data acquisition software) and continuously.
QA/QC procedures to be applied:	Measuring equipment should be calibrated on regular equipment. During the time of calibration and maintenance, alternative equipment should be used for monitoring. The class of accuracy and calibration frequency should be the specified in the Manufacturer technical equipment specifications and/or in the UTE monitoring procedures/rules.
Any comment:	This data won't be used to calculate the project emission reduction.

[8] Related to the BFG necessary to provide a generation with 32,850 MWh/year (5MW x 8760 x 0.75), so is included the thermoelectric auxiliary equipments electricity consume

	The value data for $Q_{BFG,y}$ mentioned above was used as technical data in the start of the thermoelectric project design.

Data / Parameter:	*charcoal consumption*
Data unit:	t/year
Description:	Siderpita annual charcoal consumption.
Source of data to be used:	Project Participant
Value of data	161,801[9] average
Description of measurement methods and procedures to be applied:	Charcoal is derived from a renewable raw material. So, the Blast Furnace Gas (BFG) is a renewable source for energy generation. Charcoal sales invoices or the charcoal consumes delivered to the IEF[10] can provide coherency.
QA/QC procedures to be applied:	The data will be annually filed (paper) and for two years after the end of project activity will be kept.
Any comment:	SIDERPITA don´t use fossil fuel.

B.7.2 Description of the monitoring plan:

The monitoring plan for the project activity is based on the methodology AMS ID.

1) **Power generation and measurement system:**

General characteristics of the measurement system:

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

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

---

[9] 161,801 is related to the 100% of the Blast Furnace Gas (BFG) produced by the Pig Iron plant.

[10] IEF – The State Forestry Institute proposes and executes forestry policy, fisheries and aquaculture development. Is bounded to the Secretary of State for Environment and Sustainable Development, responsible for the vegetation preservation and conservation, the renewable natural resources development, for research in biomass and biodiversity, the forest inventory and mapping of vegetation cover in the state. Administers the conservation state units, environmental protection areas for the conservation and preservation.

The measurement panels are located in the measurement cabins in the UTE. The measurement system must contain also a communication system that has the function to send the electricity data dispatched for the grid to the CCEE.

Data monitoring:

The meter readings are used for the emission reductions calculate.

The project owner provides the meter readings, access to the CCEE databank, Data Acquision Software registries and/or sales invoices copies.

Furthermore, the amount of Blast Furnace Gas consumed by the plant shall be recorded through the Control and Data Acquisition Software.

Quality control:

(1) Meter calibration

The meter calibration shall be conducted by qualified organization comply with national standards and industrial regulations to ensure the accuracy. Regarding the frequency, it shall occur according to Siderpita procedures for calibration and the meters must be sealed for safety after calibration. The calibration records must be archived together with other monitoring records.

The class of accuracy in the equipment used in the project activity is under the national standards (NBR 14519 from Associação Brasileira de Normas Técnicas – Brazilian Association of Technical Standards). It can be viewed in the Grid Procedures from the National Grid Operator: Module 12, Sub-module12.2 Installation of the Measurement System for Billing in the link: http://www.ons.org.br/download/procedimentos/Submodulo%2012.2_v10.0.pdf

(2) Emergency treatment

In case of unavailability of measures from the electricity dispatched to the grid, due to maintenance, commissioning or for any other reason, will be used the methodology to estimate data as the item 14.3 of the Procedure of Energy Commercialization PdC ME.01[11] .

Data Management:

All the project activity issues regarding the thermoelectric plant will be treated by the UTE Siderpita plant Manager.

The monitoring data will be stored during the project's duration. All data gathered in the monitoring range will be electronically filed and kept for at least 2 years after the last crediting period.

Training Procedures:

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

All the training necessary for the plant operational team, was provided during the plant construction and during the start plant commercial operation. Also a plant operation manual was created in order to provide assured instructions.

Training and studies were provided during the project implementation in order to allow the plant professionals to understand the equipment and process for thermal electric power generation and the metering process, some training examples are listed below:

- Brazilian Regulamentary Standard (NR-13),
- Live operation training period in other thermoelectric plant (*UTE Barreiro-* already registered as a CDM project);
- Equipment supplier operational instructions/trainning;
- Also recycling training is forecasted.

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

2) **Emission Factors:**

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

More details in Annex 4.

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

Date of completing the final draft of this baseline section: 30/06/2008.

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

Job title:	Director

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:

14 July 2005 date when the contract between the project sponsors was signed (the commitment with all the project activity expenditures).

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

10 years - 0 months

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

C.2.1. Renewable crediting period

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

Not applicable.

C.2.1.2. Length of the first crediting period:

Not applicable.

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

01/01/2010 or in the UNFCCC registration date.

C.2.2.2. Length:

7 years - 6 months

SECTION D. Environmental impacts

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

With respect to regulatory permits:

The UTE SIDERPITA has authorizations issued by ANEEL:

- Dispatch from ANEEL no. 2,108, issued on 14 September 2006, as proceedings No. 48500.001300/2006-70, registering the UTE SIDERPITA with installed capacity of 5,000 kW.

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

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

The UTE SIDERPITA has the following environmental permits so far:

- Provisional authorization for operation from FEAM - State Environmental Foundation, issued on 6 July 2007;
- LAI No. 003/2007 Installation License from FEAM, issued on 13 February 2007, valid until 13 February 2008.
- COPAM #0011/1977/009/2007 (2007/07/06) interim Operation License.

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 project activity is based upon using blast furnace gas for electric power generation; we may consider that this has a positive impact, since it uses a gas that would be inefficiently burned, without adding benefits to the environment and the electric sector, as raw material.

The increased power generation shall replace the power imported from the electric grid and also, the power generation inside the pig iron plant shall avoid the impacts of possible expansions of transmission lines for supplying the SIDERPITA plant.

With the installation of the thermoelectric plant was observed a reduction in the amount of particulates that no longer were disposed into the atmosphere.

A positive impact in the social field is the generation of new jobs and the consequent contribution for increasing income distribution.

SECTION E. Stakeholders' comments

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

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

The invitation letter shall be addressed to the following agents involved and affected by activities of the project:

o City Hall and City Councils;
o State environmental body;
o Municipal environmental body;
o Brazilian Forum of NGOs and Environmental and Development Social Movements;
o Community associations;
o Government Prosecutors Office.

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

- City Hall of Municipality Pitangui;
- Environment Secretary of Municipality Pitangui;
- City Council of Municipality Pitangui;
- Câmara dos Dirigentes Lojistas de Pitangui;
- Syndicate of Minas Midwest steel industry;
- State Environment Foundation – FEAM;
- Brazilian Forum of NGOs and Environmental and Development Social Movements - FBOMS;
- State Prosecutors Office of State of Minas Gerais;

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

E.2. Summary of the comments received:

Only the Municipal Government of the Municipality of Pitangui and the Municipal House of Representatives of Pitangui has commented the project.

The Government of the municipality where the project activity shall be developed has manifested a positive interest wishing success to the developers of this project and, also congratulating them.

The Municipal House of Representatives of Pitangui also presented a positive opinion about the development of this project, sustaining that the same has social-economical and environmental importance, besides manifesting their appreciation and consideration.

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

Due the positive comments received was not necessary to answer any comment.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	COMPANHIA SIDERÚRGICA PITANGUI
Street/P.O.Box:	Fazenda Velho da Taipa S/N
City:	Pitangui
State/Region:	Minas Gerais
Postfix/ZIP:	35.650-000
Country:	Brazil
Telephone:	+55 (37) 3271-9000
FAX:	+55 (37) 3271-9030
E-Mail:	
Represented by:	
Title:	Director
Salutation:	Mr.
Last Name:	Cardoso
Middle Name:	
First Name:	Newton
Department:	CEO
Mobile:	
Direct FAX:	+55 (37) 3271-9030
Direct tel:	+55 (37) 3271-9000
Personal E-Mail:	newtonjr@siderpita.com.br

Organization:	EFFICIENTIA S.A.
Street/P.O.Box:	Av. Afonso Pena, nº 1964 - 7º andar
City:	Belo Horizonte
State/Region:	Minas Gerais
Postfix/ZIP:	30130-005
Country:	Brazil
Telephone:	+55 (31) 3273 3685
FAX:	+55 (31) 3274 1763
E-Mail:	
Represented by:	
Title:	Director
Salutation:	Mr.
Last Name:	Alves
Middle Name:	Marcus
First Name:	Túlio
Department:	Administration
Mobile:	
Direct FAX:	+55 (31) 3274 1763
Direct tel:	+55 (31) 3273 3685
Personal E-Mail:	tuliomma@efficientia.com.br

Organization:	CARBOTRADER Assessoria e Consultoria em Energia Ltda
Street/P.O.Box:	Rua Vinte e Três de Maio, nº 790 , sala 22 A
City:	Jundiaí
State/Region:	São Paulo
Postfix/ZIP:	13.207-070
Country:	Brazil
Telephone:	+ 55 (11) 4522 7180
FAX:	+ 55 (11) 4522 7180
E-Mail:	moraes.arthur@carbotrader.com
Represented by:	
Title:	Director
Salutation:	Mr.
Last Name:	Moraes
Middle Name:	Augusto Clessie
First Name:	Arthur
Department:	
Mobile:	
Direct FAX:	+ 55 (11) 4522 7180
Direct tel:	+ 55 (11) 4522 7180
Personal E-Mail:	moraes.arthur@carbotrader.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding from the Annex I Countries is involved in the present project.

Annex 3

BASELINE INFORMATION

The CO_2 emission factors for power generation in the Brazilian National Interconnected System (SIN) are calculated based on generation records of plants centrally dispatched by the National Operator of the Electric System (ONS) and, in particular, thermoelectric power plants. Such information is required by renewable energy projects connected to the electrical grid and implemented by under the Clean Development Mechanism (CDM) of the Kyoto Protocol.

The ONS was responsible for explaining to the group the operation practices of the SIN, according to regulations by ANEEL (National Electrical Energy Agency). In keeping with such procedures, CO_2 emission factors have been calculated by ONS for a single system since 27 May 2008.

More details in the DNA webpage:
http://www.mct.gov.br/upd_blob/0024/24563.pdf

Annex 4

MONITORING INFORMATION

a) Monitoring of Electricity supplied by the project activity (EG_y)

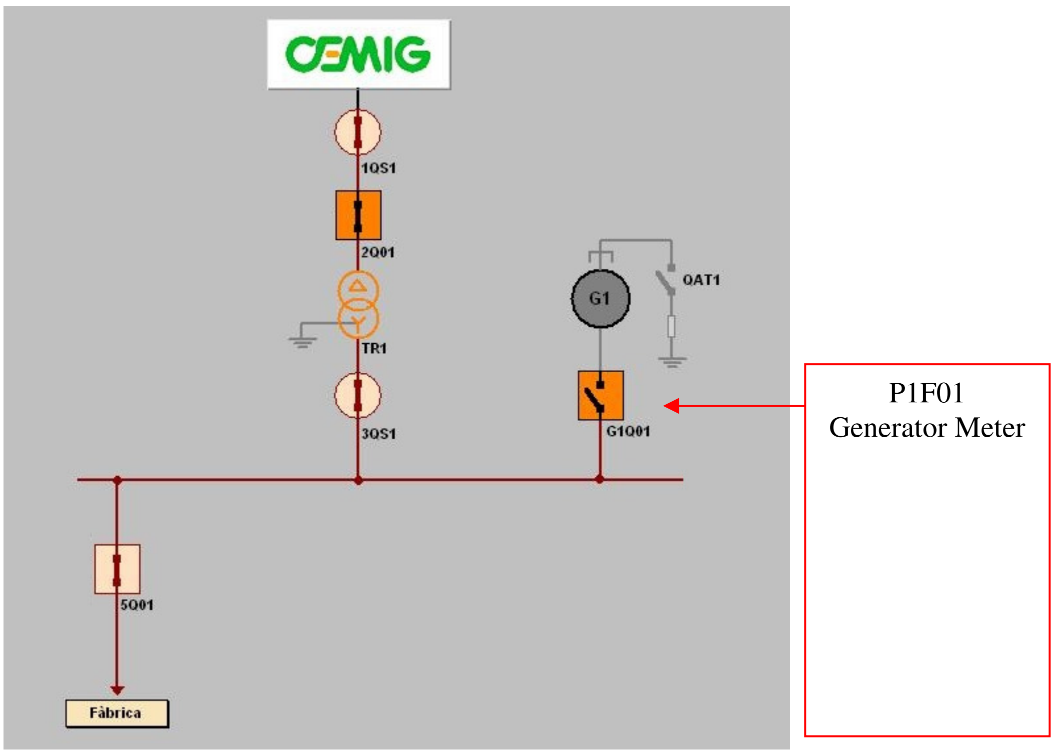
The measurements of the electricity generated by the Siderpita thermoelectric power plant will be performed by the P1F01 generator relay protection and measurement (manufacturer GE - General Electric, model 489 GMR). This measurement will be performed at low voltage (380 Vac).

The electronic record of the energy generated will be obtained from the P1F01generator meter automatically at intervals of 15 minutes using the software: GESTAL SMART 32. With this software it´s possible to track and record the daily, monthly and annual generation.

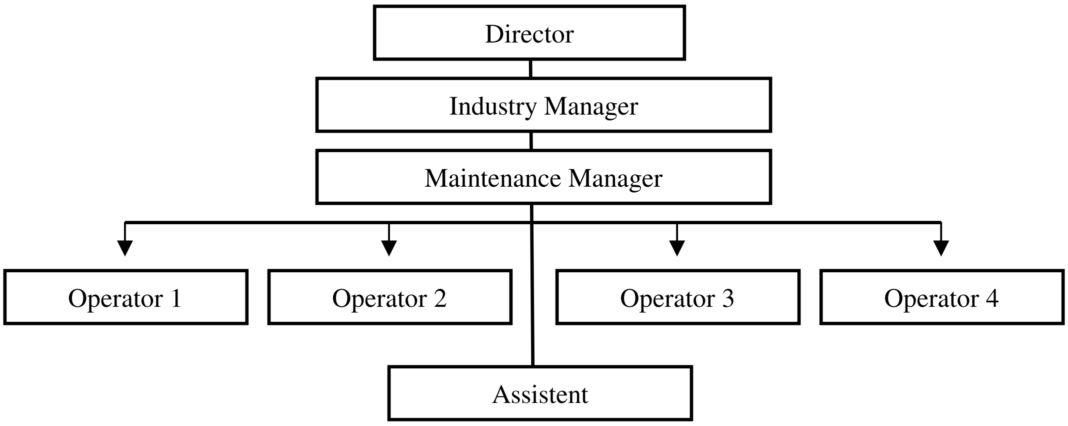
The data shall be stored in daily files created by the software in the microcomputer Hard Disk (HD) – located in the UTE control room. Monthly a back-up of the files generated is done and it will be stored for a minimum period of 12 years together the manual spreadsheets.

The data from the electronic records shall be checked by the Manager of the UTE in order to verify the consistency; others cross check method can be used.

The figure below show the scheme involved in the monitoring plan:



b) Operational and Management Structure



The Operators are directly responsible for the thermoelectric operation.
The Maintenance Manager is responsible for all data register validation and any other issue about the thermoelectric power plant.

Companhia Siderúrgica Pitangui (SIDERPITA) has procedures for maintenance of equipment and installations. The ENGEMAN software is used to program (annually) the maintenance of the generator, the turbine and the boiler. Calibration intervals are defined on the procedure and in accordance with the calibration requirements.