CLEAN DEVELOPMENT MECHANISM

SMALL SCALE PROJECT DESIGN DOCUMENT (CDM-PDD)

COSIPAR RENEWABLE ELECTRICITY GENERATION PROJECT, STATE OF PARÁ

Prepared by
EcoSecurities Ltd
Revision 4~~3~~

October~~September~~, 2005

CONTENTS

A. GENERAL DESCRIPTION OF PROJECT ACTIVITY

A.1 Title of the project activity:

Cosipar Renewable Electricity Generation Project.

A.2 Description of the project activity:

The project activity consists in the expansion of a 4 MW to 10 MW thermoelectric plant. Therefore, the project will claim for carbon credits correspondent to 6 MW of installed capacity. The new plant is fired by blast furnace gas to generate part of the electricity required by Cosipar Pig Iron Plant. The only fuel used by the plant will be the blast furnace gas. With the installation of this new thermoelectric, the old facility will only be used as stand-by plant, in case of any emergency. As a consequence of the construction of the plant there will be a reduced need for electricity supplied from the grid for the operation of the pig iron plant and in case of any surplus, this will be sold to the N/NE subsystem.

Currently, Cosipar purchases approximately 53,690 MWh/year from the Centrais Elétricas do Pará (CELPA), however, in the project scenario 45,503 MWh/year will be supplied by the project activity, thereby decreasing total demand from CELPA to 8,187 MWh/year. Cosipar Pig Iron Plant is located in the municipality of Marabá, in the State of Pará.

Cosipar is a private company producing Basic/Foundry Pig Iron industry that is part of ASICA, an association of pig iron industries located in the Carajás region. The Carajás region includes the states of Maranhão and Pará. It produces total annual output of 450,000 tonnes of pig iron per year.

Use of the blast furnace gas to generate electricity will not generate greenhouse gas (GHG) emissions for two reasons: i) because this fuel is a by-product of sustainable charcoal production, it can be considered a renewable source of energy with zero, or negligible, GHG emissions associated with its combustion. As a result, the project will be displacing electricity generation from a more fossil-intensive grid and reducing GHG emissions in the process; and ii) in the absence of the project, the blast furnace gas would have continued to be flared. Therefore it is assumed that there will be no additional GHG emissions associated with the use of this gas to generate electricity.

Table 1 below summarises the baseline and project scenarios.

Table 1: Summary of Cosipar Thermoelectric Plant Project Improvements

Baseline scenario	Project scenario
Consumption of 53,690 MWh/year from CELPA.	Generation of 45,503 MWh per year through the expansion of a renewable energy facility on site and the corresponding reduction in consumption of electricity from CELPA .

As a result of the project intervention, 45,503 MWh per year will be displaced from the grid, resulting in a yearly reduction of 18,536 tonnes of CO_2 equivalent (tCO_2e). Over the 21 year crediting period approximately 934,900 MWh will be displaced, and a total of 389,249 tCO_2e will be reduced.

The participants of the project recognizes that Cosipar Renewable Electricity Generation Project is helping Brazil fulfil its goals of promoting sustainable development. Specifically, the project is in line with host-country specific CDM requirements because:

- It contributes to local environmental sustainability since it will decrease the purchase of fossil energy from the grid through the use of an alternative non fossil fuel, the blast furnace gas. Also, in the absence of this project, the gas would be flared and simply released to the atmosphere without any final use. Therefore, the project contributes to the better use of natural local resources. Besides, it uses clean and efficient technologies, and conserves natural resources, thus the project will be meeting the Agenda 21 and Sustainable Development Criteria of Brazil.
- Contributes for best work condition and increases employment opportunities in the area where the project is located according to Cosipar's recorded data;
- Contributes for revenue distribution since the use of a renewable fuel decreases dependence on fossil fuels; decreases the pollution and therefore the social costs related to this; diversifies the sources of electricity generation; and finally decentralizes the energy generation;
- Contributes for technological and capacity development – all technology, hand labour and technical maintenance will be provided inside Brazil. The whole system like boiler, turbines and generator presents high efficiency. This type of project will stimulate the Brazilian industry for innovative initiatives inside the energy sector. It acts as a clean technology demonstration project, encouraging development of modern and more efficient generation of electricity and thermal energy using biomass fuel throughout Brazil;
- Contributes for regional integration and connection with other sectors – the project facilitates the increase on blast furnace gas as a fuel in the region where it is located and therefore it integrates other similar companies that wants to replicate the experience of Cosipar. Also, it creates an alternative market for this kind of energy generation, indirectly joining the Brazilian energy and environmental sectors.

A.3 Project participants:

Official contacts for the project activity:

- Project Developer:
Cosipar -Cia. Siderúrgica do Pará
- EcoSecurities Ltd

Further information on project participants can be found in Annex 1 .

A.4 Technical description of the project activity:

A.4.1 Location of the project activity:

A.4.1.1 <u>Host country Party</u>: Brazil.

A.4.1.2 <u>Region/State/Province etc.</u>: North region of Brazil, State of Pará.

A.4.1.3 <u>City/Town/Community etc</u>: City of Marabá.

A.4.1.4 Detailed description of the physical location: The project is located at Cosipar main industrial complex, in the city of Marabá (see Figures 1 and 2), (Rodovia PA 150, s/n, km 422-Distrito Industrial. CEP 68501-535).

Figure 1: Cosipar Pig Iron Plant.

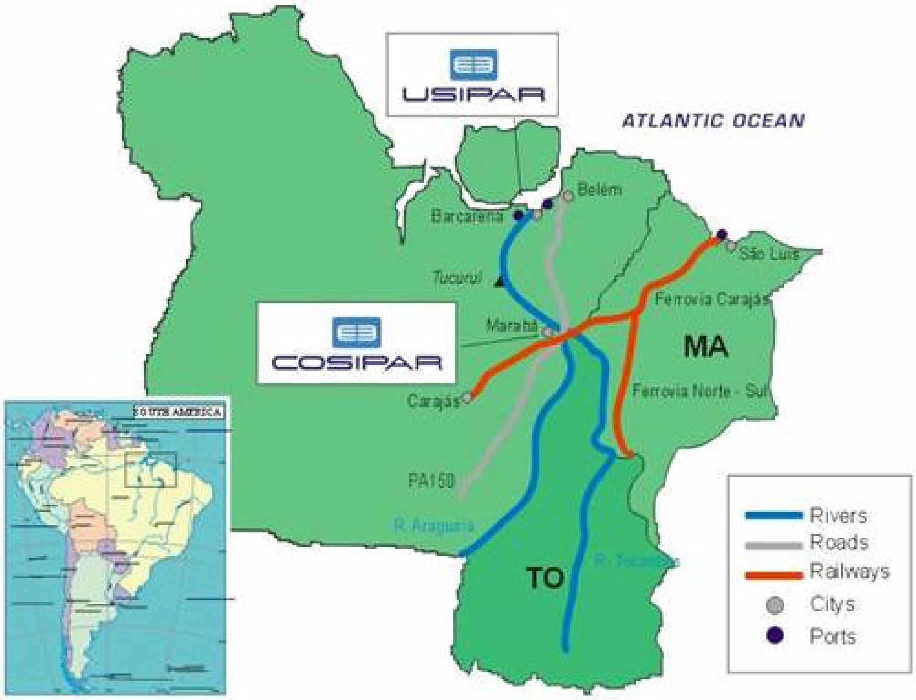

Figure 2: Map with location of Marabá, Cosipar.

A.4.2 Type and category(ies) and technology of project activity

According to the simplified modalities and procedures for small-scale CDM project activities, the Cosipar Renewable Electricity Generation Project falls under the Type/Category I.D. (Renewable Energy Projects / Renewable electricity generation for a grid). The project will be generating electricity from renewable sources and displacing electricity generated by the grid.

The Project will be powered only by blast furnace gas as renewable fuel. The generation of the blast furnace gas is a consequence of the reaction carbon content of charcoal with the oxygen of atmospheric air and of oxygen of Iron oxide, resulting in CO and CO_2. The carbon may also react with hydrogen from atmospheric air; resulting in CH_4.The main blast furnace gases that are used as fuel are CO and CH_4, however, the gases are not separated from the other gases, which do not have a workable calorific power. Therefore the resources used to generate the blast furnace gas are the carbon from charcoal and oxygen from atmospheric air.

It is worth noting here that the blast furnace gas is considered emission neutral as it would continue to be flared if the project did not go ahead, also all the pig iron production from the Cosipar Plant is based on the use of charcoal, obtained from renewable forests. Therefore the blast furnace gas generated is a form of biomass energy and is renewable. In a way this is similar to the use of sugar cane bagasse to produce energy; the bagasse is a by-product of the process to produce alcohol and sugar but it is still a renewable energy source. To reinforce that position DNV has recently validated the UTE Barreiro S.A. Renewable Electricity Generation Project – Brazil, which also characterises the blast furnace gas of charcoal based furnace as renewable energy.

Concerning the displacement of energy from grid, the I.D methodology comprises projects "that supply electricity to an electricity distribution system". In this case, although part of the electricity generated by the project would be used by the plant and would not be exported it would still reduce the imports from grid, avoiding marginal fossil fuel based electricity generation. It is interesting to note that the electricity generation and the consumption directly in site is more efficient that the exportation of electricity to grid and the consumption of it.

The technology to be used consists of a boiler, turbine and generator purchased from ABB and Koblitz. The new plant is expanding capacity from 4 to 10MW and it is expected to operate at a load factor of 84%. The project uses state of the art technology and it will not be substituted by other or more efficient technologies in the foreseen future.

The plant consumes the blast furnace gas released by blast furnaces. The gas is rich in methane and carbon monoxide. Residual gas is reused for air heating and the rest will be burnt in chimneys and released to the atmosphere as CO2. For the production of 10 MW, around 25 Nm3/h of gas is consumed.
The boiler used by Cosipar consumes approximately 45 m3/hour of water, from which 1.2 to 2 m^3 is obtained from evaporator and the remaining is originated from the condensate tank.~~The boiler used by Cosipar consumes approximately 45 m3/hour of water that produces approximately 2.5 m3 of liquid industrial effluents that are transported to a purge tank~~. For the boiler operation, maintenance, inspection and supervision, the company has hired specialized employees and has elaborated ~~-~~a Fire Prevention Programme, which consists in an emergency programme specifically for boiler procedures, avoiding panic, dispersion and lost of control during risk situation.

The thermo unit consists of:
- Boiler: Acqua Tubular Equipalcool, model 35-V-2-S ~~with average water consumption of 25 m^3/h. From this total, 1.2 to 2 m^3/h is distilled in the evaporator and the rest comes from condensate tank. Its maximum vapour production is of 35 ton/h and generates two types of effluents: bottom boiler discharge (with chemical products such as hydrazine) and chimneys particulates.~~
- Turbine: Dresser Hand, with 10 MW of installed capacity; model Enseturb ET8.
- Generator: GE. Model 271R496. Installed capacity of 10 MW.

- Evaporator: Distillates from 1.2~~5~~ to 2 m³/h of water and generates mud and hot water, free from chemical products.

Figure 3: Acqua Tubular Equipalcool Boiler.

Figure 4: Cooling tower.

Figure 5: Dresser Hand turbine, with 10 MW of installed capacity.

The technology and know-how being promoted by this project is environmentally safe and sound, and will further promote such activities in the future.

A.4.3 Brief statement on how anthropogenic emissions of greenhouse gases (GHGs) by sources are to be reduced by the proposed CDM project activity:

The production of pig iron involves the consumption of a vast amount of energy and a series of heat transfer processes. At the pig iron production process is the blast furnace that has the function to chemically reduce iron oxides into liquid iron called "hot metal". Iron ore and charcoal are dumped into the top of the furnace and preheated air is blown into the bottom. The hot air blown into the bottom of the furnace ascends to the top after going through several chemical reactions, as the diagram below explains:

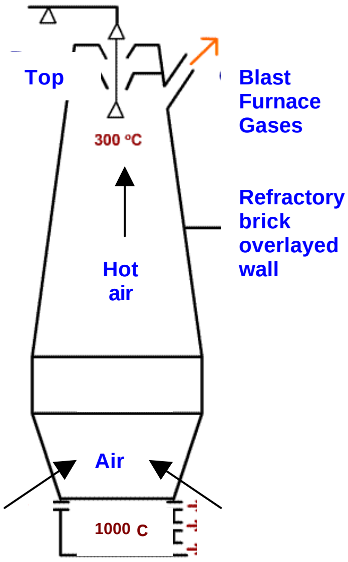

Figure 6: Scheme of blast furnace gas generation (Adapted from Pimenta, 2003).

Another product of the iron making process, in addition to molten iron and slag, is a hot dirty gas known as blast furnace gas. The gas exits the top of the blast furnace and proceeds through gas cleaning equipment where particulate matter is removed from the gas and the gas is cooled. This gas has a considerable energy value so a small amount is burned as a fuel in stoves which are used to preheat the air entering the blast furnace. Any of the gas not burned in the stoves can be used to generate steam.

In this project the remaining blast furnace gas, which is currently being flared, will be used as fuel for electricity generation expansion. Considering that charcoal, instead of fossil coke, is used in Cosipar Pig Iron Plant, and that all the charcoal used is obtained through the carbonisation of wood from renewable forests, the blast furnace gas is considered carbon neutral. In addition, the electricity generated will displace fossil fuelled electricity from the grid.
The only greenhouse gas that will be considered in the project calculations is CO_2. Methane (CH_4) emissions will not be modified by the project since blast furnace gas - which contains approximately 2% Methane - is combusted in both the baseline and project scenarios.

N_2O, HFCs, PFCs and SF_6 are not applicable to this project.

A.4.4 Public funding of the project activity:

The project will not receive any public funding from Parties included in Annex I.

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

Cosipar is developing two more CDM projects. The first of these is the Cosipar Forestry Project, which has not yet been presented due to uncertainties regarding reforestation modalities and procedures. The second project being developed by Cosipar is the "Cosipar Carbonisation Improvements" project, which reduces methane emission from carbonisation activities created from Cosipar carbonisation plants, through a new technology that burns the smoke released by carbonisation activities. This project is located on Cosipar forests, near to the industrial complex and it will start on January 2006. It has the capacity to generate approximately 2.4 million tonnes of CO_2 emission reduction equivalents over a 21-year timeframe, therefore it is a large scale project, that fits into the category # 10, from UNFCCC's list of sectoral scopes: "Fugitive emissions from fuels (solid, oil and gas)".

According to Appendix C of the Simplified Modalities and Procedures for Small-Scale CDM project activities, the proposed project activity is not a fragmentation of a larger project if the analysis presented in Table 2 below results in an negative. The proposed project activity will be considered a debundled component of a larger if the project participants, project category, registration date and project boundary are the same for all projects. Table 2 below analyses the debundling issue of the proposed project activity and the other projects developed by Cosipar and concluded that proposed project activity in not a debundled component of a larger project.

Table 2: Debundling Occurrence Analysis.

Item \ Project	Cosipar Thermoelectric Plant	Cosipar Forestry Project	Cosipar Carbonisation Improvements	Occurrence of Debundling
Project Participants	Cosipar	Cosipar	Cosipar	Yes
Project category	Renewable electricity generation for a grid	Carbon Sequestration	Methane Emissions Reduction	No
Registration	To be registered soon	To be registered soon	To be registered soon	Possible
Boundary	Cosipar Pig Iron production plant	Cosipar Forests	Cosipar carbonisation plants	No
Result (the project will be a debundling of a larger project if the four items above occur):				**NO**

B. BASELINE METHODOLOGY

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

Project Activity 1.D. - Renewable electricity generation for a grid.

B.2 Project category applicable to the project activity:

According to the sectoral scope list presented by UNFCCC (http://cdm.unfccc.int/), the project is related with the sectoral scope 1 Energy industries (renewable - / non-renewable sources).

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

According to Attachment A of Appendix B of the simplified modalities and procedures for CDM small-scale project activities, evidence to why the proposed project is additional can be done by conducting an analysis of the following: (a) investment barriers, (b) technological barriers, and (c) prevailing practice.

The result is a matrix that summarises the analyses, providing an indication of the barriers faced by each scenario. The most plausible scenario will be the one with the fewest barriers.

The first step in the process is to list the likely future scenarios. Two scenarios were considered:

- Scenario 1 - The continuation of current activities – This scenario represents the continuation of current practices, which is the electricity being supplied from the grid.

- Scenario 2 - The construction of the new renewable energy plant – In this scenario, a new source of low carbon emissions electricity will be available and will displace the higher carbon intensity electricity prevailing in the baseline scenario.

The barriers are as follows:

- Financial/economical – This barrier evaluates the viability, attractiveness and financial and economic risks associated with each scenario, considering the overall economics of the project and/or economical conditions in the country.

- Technical/technological – This barrier evaluates whether the technology is currently available, if there are indigenous skills to operate it, if the application of the technology is a regional, national or global standard, and generally if there are technological risks associated with the particular project outcome being evaluated.

- Prevailing business practice – This barrier evaluates whether the project activity represents prevailing business practice in the industry. In other words, this barrier assesses whether in the absence of regulations it is a standard practice in the industry, if there is experience to apply the technology and if there tends to be high-level management priority for such activities.

With respect to **financial/economical** barriers:

- The continuation of current practices (Scenario 1) does not pose any financial/economical barrier to the project developer, and requires no further financing.

- The construction of a renewable energy plant (Scenario 2) faces specific financial/economic barriers due to the fact that technical/technological innovations carry with them risk premiums in terms of financing. The capital costs involved in the project pose a barrier, especially considering the high interest rates prevalent in developing countries. It is worth noting that there are no direct subsidies or promotional support for the implementation of independent renewable energy plants. The financial/economical barrier to the project activity is demonstrated through a cash flow financial analysis. Comparing the project results with and without carbon, it is clearly demonstrated that the project would not occur without carbon revenues (see table 3 below). The investment analysis considers all savings and expenses associated to the project such as the revenues from costs reduction with electricity and fuel purchases and the costs associated to the installation and operation of new plant. Values used in the financial analysis are presented in the Annex 4. The carbon revenues increase the returns of the project to an acceptable level compared to other investments in Brazil.

Table 3: Financial Results for project scenario.

	with carbon	without C
Net Present Value ($)	361.961	(170.688)
IRR	13%	11%
Discount rate	12%	
Present Value of carbon sold (21 years) $	**662.234**	

With respect to the **technical/technological** barrier:

- In the case of Scenario 1 (continuation), there are no technical/technological issues as this simply represents a continuation of current practices and does not involve any new technology or innovation. Indeed, in this scenario there are no technical/technological implications as the scenario calls for continued use of electricity from the grid.

- In the case of Scenario 2, there are no significant technical/technological barriers. All the technologies involved in this scenario are available in the market, and have been used effectively in Brazil.

With respect to the analysis of **prevailing business practice**:

- The continuation of current practices (Scenario 1) presents no particular obstacles. This practice has been used effectively in the past with good results, and the continued operation of existing facilities and actual practices presents no real barriers.

- The construction of the extension to the energy plant (Scenario 2) does not represent a deviation from the company's core business.

Table 4 below summarises the results of the analysis regarding the barriers faced by each of the plausible scenarios. As the table indicates, Scenario 1 faces no barriers, whereas Scenario 2 faces one important barrier – the financial/economic barrier.

With respect to the analysis of **other barriers**:

- The continuation of current practices (Scenario 1) presents no other barriers.

- The construction of the extension to the energy plant (Scenario 2) does not present other barriers.

Table 4: Summary of Barriers Analysis

Barrier Evaluated		Scenario 1	Scenario 2
		Continuation of current activities	Construction of a new plant
1.	Financial / Economical	No	Yes
2.	Technical / Technological	No	No
3.	Prevailing Business Practice	No	No
4	Other Barriers	No	No

To conclude, the barrier analysis above has shown that the most plausible scenario is the continuation of current practices (continuation of use of electricity from the grid). Therefore, the project scenario is not the same as the baseline scenario, and these are defined as follows:

- The **Baseline Scenario** is represented by the continued use of electricity from the grid.

- The **Project Scenario** is represented by the construction of a new renewable energy plant. The new plant will displace electricity imported from a more carbon-intensive source, thus resulting in significant GHG emission reductions.

The Project Scenario is environmentally additional in comparison to the baseline scenario, and therefore eligible to receive Certified Emissions Reductions (CERs) under the CDM.

B.4 Description of the project boundary for the project activity:

The project boundary is defined as the notional margin around a project within which the project's impact (in terms of carbon emission reductions) will be assessed. As referred to in Appendix B for small-scale project activities, the project boundary for a small scale renewable energy project that provides electricity to a grid encompasses the physical, geographical site of the renewable generation source. For the Project this includes emissions from activities that occur at the project location.

The system boundary for the baseline is defined as the national grid of Brazil, and will include all the direct emissions related to the electricity produced by the power plants to be displaced by the Project.

B.5 Details of the baseline and its development:

B.5.1 Specify the baseline for the proposed project activity using a methodology specified in the applicable project category for small-scale CDM project activities contained in appendix B of the simplified M&P for small-scale CDM project activities:

The Project uses baseline Type 1.D with option (a) of paragraph 29 of Appendix B, related to the generation and supply of renewable energy to the grid.

All data used to calculate the Operating, Combined and Build Margins were based on ANEEL (The National Electricity Agency) and ONS (The National System Operator) database. The whole references are presented on calculation sheets.

For more details about the calculation, please see section E.1.1.

B.5.2 Date of completing the final draft of this baseline section:

27/08/2004

B.5.3 Name of person/entity determining the baseline:

The entity determining the baseline and participating in the project as its Carbon Advisor is EcoSecurities Ltd. The individuals at EcoSecurities that prepared the baseline are Pablo Fernandez de Mello e Souza, Flávia Resende and Sonia Medina as listed in Annex 1 of this document.

C. DURATION OF THE PROJECT ACTIVITY AND CREDITING PERIOD

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity (DD/MM/YYYY):

01/07/2003

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

21y-00m

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

(Please underline the selected option (C.2.1. or C.2.2.) and provide the necessary information for that option.)

C.2.1. Renewable crediting period (at most seven 7 years per period)

C.2.1.1. Starting date of the first crediting period **(DD/MM/YYYY):**

01/10/2003

C.2.1.2. Length of the first crediting period:

7y – 0m

C.2.2. Fixed crediting period (at most ten (10) years)

C.2.2.1. Starting date **(DD/MM/YYYY):**

N/A

C.2.2.2. Length (max 10 years):

N/A

D. MONITORING METHODOLOGY AND PLAN

D.1. Name and reference of approved methodology applied to the project activity:

Monitoring methodology described in paragraph 31 of Appendix 3 of the Simplified Modalities and Procedures for Small Scale CDM project activities, Baseline Type 1.D.

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

As the project is eligible for using the methodologies listed in Appendix B of the Simplified Modalities and Procedures for Small Scale CDM project activities, it was felt that it should use the monitoring methodologies proposed for this project type.

D.3 Data to be monitored:

Table 5: Data to be collected in order to monitor emissions from the project activity, and how this data will be archived

ID n°	Data type	Data variable	Data unit	Measured (m), calculated (c) indicated (I) 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
D.3.1	Electricity	Electricity produced by Project	MWh	M	Continuous	100%	Electronic and paper	During the whole crediting period + 2 years	This item will be monitored by meters and through the statements of the distribution company
D.3.2	Fuel	Energy content of charcoal	TJ/tonne	E	Annual	100%	Electronic and paper	During the whole crediting period + 2 years	
D.3.3	Fuel	Amount of charcoal input	tonnes	M	Monthly	100%	Electronic and paper	During the whole crediting period + 2 years	

D.4. Name of person/entity determining the monitoring methodology:

EcoSecurities Ltd is the entity determining the monitoring plan and participating in the project as the Carbon Advisor.

E. CALCULATION OF GHG EMISSION REDUCTIONS BY SOURCES

E.1 Formulae used:

E.1.1 Selected formulae as provided in appendix B

No formula is provided to quantify emission reduction of electricity generation in the Baseline Type 1.D.

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

No formula is needed. Emissions by sources are nil since renewable energy is either a zero CO_2 or CO_2 neutral source of energy.

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

This is not applicable as the renewable energy technology used is not going to be transferred from another activity. Therefore, as per the Simplified Procedures for SSC Project Activities no leakage calculation is required.

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

Zero emissions (0 tCO_2e).

E.1.2.4 Describe the formulae used to estimate the anthropogenic emissions by sources of GHG's 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: *(for each gas, source, formulae/algorithm, emissions in units of CO_2 equivalent)*

The baseline emissions reduction (BE_y) resulting from the electricity supplied to the grid is calculated as follows, where EG_y is the annual electricity generated from the Project.

$$BE_y = EG_y * EF_y$$

The baseline emissions factor *(EF_y)* is a weighted average of the EF_OM_y and EF_BM_y:

$$= (w_{OM} * EF\_OM_y) + (w_{BM} * EF\_BM_y)$$

where the weights *? $_{OM}$* and *? $_{BM}$* are by default 0.5.

The Operating Margin emission factor (EF_OM_y) is calculated using the following equation:

$$EF\_OM_y\,(tCO_2/MWh) = \frac{\sum_{i,j} F_{i,j,y} * COEF_{i,j}}{\sum_j GEN_{j.y}]}$$

Where:

$F_{i,j,y}$ is the amount of fuel i (in GJ) consumed by power source j in year y;

j is the set of plants delivering electricity to the grid, not including low-cost or must-run plants and carbon financed plants;

$COEF_{i,j,y}$ is the carbon coefficient of fuel i (tCO_2/GJ);

$GEN_{j.y}$ is the electricity (MWh) delivered to the grid by source j.

The Build Margin emission factor (EF_BM_y) is the weighted average emission factor of a sample of power plants *m*. This sample includes either the last five plants built or the most recent plants that combined account for 20% of the total generation, whichever is greater (in MWh). The equation for the build margin emission factor is:

$$EF\_BM_y\,(tCO_2/MWh) = \frac{[\sum_{i,m} F_{i,m,y} * COEF_{i,m}]}{[\sum_m GEN_{m.y}]}$$

where $F_{i.m,y}$, $COEF_{i,m}$ *and* GEN_m are analogous to the *OM* calculation above.

Operating, Build and Combined Margins calculations followed the rules of category ID of the Appendix B of "Simplified modalities and procedures for small-scale clean development mechanisms project activities". All data used to calculate the Operating, Combined and Build Margins were based on ANEEL (The National Electricity Agency) and ONS (The National System Operator) database. The whole references are presented on calculation sheets.

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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 total emission reductions ER_y of the project activity during any given year y is the difference between the baseline emissions (BE_y in tCO_2) and leakage:

$$ER_y = BE_y - PEy - Leakage$$

However, in the case of small scale baselines Type 1.D Leakage is assumed to be nil.

Total Emission Reductions achieved by this project is equivalent to 18.536 tCO_2/year.

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

Table 6: Electricity generation emission reduction due to project activity.

Electricity generation emission reductions	**Per year**	**Total (crediting period)**
Operating Margin Emissions Factor (EF_OM_{y}, in tCO_2/MWh)	0,840	n/a
Build Margin Emissions Factor (EF_BM_{y}, in tCO_2/MWh)	0,027	n/a
Baseline Emissions factor (EF_y)	0,433	n/a
Electricity generated by the project (EG, in MWh)	42.768	898.128
Baseline Emissions (BE, in tCO_2)	18.536	389.249
Project emissions (PE, in tCO_2)	0	0
Emission reductions from electricity generation (tCO_2)	18.536	389.249

F. ENVIRONMENTAL IMPACTS

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

For the Cosipar small-scale renewable energy project the local environmental body required no specific environmental assessment. However, an ANEEL license was required for the Project activity. This has been completed, concluding that the Project adheres to the requirements.

Considering that all the blast furnace gas would be flared if it is not used to generate electricity, the additional activity is very small, including just the expansion of an existing plant to increase the electricity production. Thus, the environmental impacts are not significant.

There are some environmental and social positive impacts from the project. For example, there will be generation of new employment. Also, the use of blast furnace gas as fuel to generate electricity is avoiding the simple flare, making good use of the calorific energy contained in this gas. The increase in electricity generation will displace energy imported from grid. The project activity will use charcoal, a renewable fuel produced by their own-planted forests. Moreover, the generation of energy inside the pig iron plant will avoid impacts of transmissions line expansions to supply the Cosipar plant.

The project should identify and minimise any negative effects on environmental and development issues in the area of operation, in addition to potential causes of leakage, during the early stages of project development. At the moment, uncertainties related to the electricity shortages make it difficult to predict whether the project may result in leakage or not. However, projects of this nature are less likely to generate substantial amounts of leakage.

The project does not expect to create any negative social or environmental impacts. In any case, the company will engage in the process of independent verification of their carbon and is prepared to address any issue that may arise from these audits.

G. STAKEHOLDERS COMMENTS

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

According to the Resolution #1 dated on December 2nd, 2003, from the Brazilian Inter-Ministerial Commission of Climate Change (Comissão Interministerial de Mudança Global do Clima -CIMGC), decreed on July 7th, 1999[1], any CDM projects must send a letter with description of the project and an invitation for comments by local stakeholders. In this case, letters were sent to the following local stakeholders:

- City Hall of Marabá;
- Chamber of Marabá;
- Environmental agencies from the State and Local Authorities;
- Brazilian Forum of NGOs;
- District Attorney (known in Portuguese as Ministério Público, i.e. the permanent institution essential for legal functions responsible for defending the legal order, democracy and social/individual interests) and;
- Local communities associations;
- Others.

Local stakeholders were invited to raise their concerns and provide comments on the project activity through www.cosipar.com.br, for a period of 30 days after receiving the letter of invitation. Cosipar was also available to answer any clarifications and doubts through Lúcia Cardoso Paixão, responsible for this project at the company.

G.2 Summary of the comments received:

No comments were made during 30 days (from August 2nd until September 2nd on 2004).

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

Not applicable since no comments were made during the period available for comments.

1 Source: http://www.mct.gov.br/clima/comunic/pdf/Resolução01p.pdf

Annex 1: CONTACT INFORMATION FOR PROJECT PARTICIPANTS

Project sponsor:

Organization:	Companhia Siderúrgica do Pará - Cosipar
Street/P.O.Box:	Rodovia PA 150, s/n, km 422 Distrito Industrial
Building:	
City:	Marabá
State/Region:	Pará - PA
Postfix/ZIP:	68501-535
Country:	Brazil
Telephone:	(94) 312 5000
FAX:	(94) 312-5006
E-Mail:	Cosipar .rio@Cosipar .com.br
URL:	http://www.Cosipar .com.br
Represented by:	
Title:	Business Development Director
Salutation:	Mr.
Last Name:	Monteiro
Middle Name:	Guilherme
First Name:	Luis
Mobile:	55 21 8128-5279
Direct FAX:	55 21 2105-6001
Direct tel:	55 21 2105-6019
Personal E-Mail:	guilherme.monteiro@Cosipar .com.br

Project Carbon advisors and Project Annex 1 sponsor:

Organization:	EcoSecurities Group Ltd, UK
Street/P.O.Box:	21 Beaumont Street
Building:	-
City:	Oxford
State/Region:	Oxfordshire
Postfix/ZIP:	OX1 2NH
Country:	United Kingdom
Telephone:	44 1865 202 635
FAX:	44 1865 251 438
E-Mail:	uk@ecosecurities.com
URL:	www.ecosecurities.com.br
Represented by:	
Title:	Director
Salutation:	Mr.
Last Name:	Moura Costa
Middle Name:	
First Name:	Pedro
Mobile:	
Direct FAX:	44 1865 792 682
Direct tel:	44 1865 202 635
Personal E-Mail:	pedro@ecosecurities.com

Annex 2: INFORMATION REGARDING PUBLIC FUNDING

This project will not receive any public funds.

ANNEX 3: STAKEHOLDERS LETTER AND CONFIRMATION

Example of letter sent to stakeholders consultation: City Hall of Marabá.

COSIPAR

Marabá, 02 de Agosto de 2004

Exmo. Sr.
Sebastião Miranda Filho
D.D. Prefeito Municipal
Marabá - PA

Assuntos:

- Projeto Cosipar de Melhoria do Processo de Carbonização
- Projeto Cosipar Pequena Escala de Energia Renovável

Prezado Senhor,

A Cia Siderúrgica do Pará – COSIPAR vem, por meio desta correspondência, informar V.Excia. sobre o desenvolvimento de projetos de mitigação dos impactos relacionados aos gases de efeito estufa originados pelo seu processo produtivo.

A COSIPAR é uma empresa produtora de ferro gusa, localizada no município de Marabá, no estado do Pará. O Projeto que ora se apresenta denominado *"Projeto Cosipar de Melhoria do Processo de Carbonização"* tem como objetivo a redução das emissões de metano provenientes da produção de carvão vegetal, insumo básico necessário ao processo de produção do ferro gusa. O metano (CH_4) é um gás de efeito estufa com forte potencial de aquecimento da atmosfera terrestre. Neste projeto, a Cosipar substituirá os atuais fornos de carbonização por outros cuja eficiência é mais alta e a saída de fumaça é reduzida.

No segundo projeto, intitulado *"Projeto Cosipar - Pequena Escala de Energia Renovável"*, a Cosipar visa a redução da dependência de energia do sistema de energia elétrica local, através da implementação de uma unidade termoelétrica de 10 MW de potência cujo combustível é o gás de alto forno: considerado um recurso renovável, pois é proveniente da produção de ferro gusa à carvão vegetal.

Geralmente os gases gerados pelos altos fornos são liberados à atmosfera, após queima na chaminé não sendo, portanto aproveitados para a geração de energia.

Com esta iniciativa, a Cosipar, voluntariamente visa mitigar os impactos ambientais associados aos gases liberados pela produção de ferro gusa em Marabá.

Para o cumprimento de uma das diretrizes da Resolução *nº. 1, de 11 de setembro de 2003, da Comissão Interministerial de Mudança Global do Clima (CIMGC)*, os projetos em questão encontram-se na etapa de divulgação, ou seja consulta às partes interessadas para, posteriormente serem auditados e apresentados aos Órgãos Governamentais competentes.

Marabá: Rodovia PA150 Km 422, Distrito Industrial Marabá, PA CEP:68508-970 (Caixa Postal 11)
Tel.+55(94)312-5000 Fax.+55(94)312-5006
Rio de Janeiro: Rua Visconde de Pirajá, Nº608 Sala 703, Ipanema - Rio de Janeiro, RJ -CEP:22410-001
Tel. +55(21)2105-6000 Fax. +55(21)2105-6001

C.EXT. 09/04

Pref. Mun. De Marabá
GABINETE DO PREFEITO
RECEBIDO EM:
09/08/04
Horário: 12:15

COSIPAR

E, nesta etapa de divulgação, de forma bem aberta e transparente, a *COSIPAR* solicita de *V.Sa.* que teçam comentários sobre os relatórios técnicos referentes aos dois projetos já mencionados, os quais se encontram disponíveis no site: www.cosipar.com.br. O prazo final para envio destes comentários é de 30 (trinta) dias, a partir da presente data.

Mais ainda solicitamos também que, caso haja necessidade de maiores esclarecimentos, favor entrar em contato com:

Lúcia Cardoso Paixão – lucia.paixao@cosipar.com.br
Av. Conselheiro Furtado, 2865 – sala 1806
Cremação – Belém – C.E.P.: 66.063-060
(0XX) 91 4008 3000

Atenciosamente,

Lúcia Cardoso da Paixão
Meio Ambiente, Segurança e Saúde Ocupacional
Cia Siderúrgica do Pará - COSIPAR

ANNEX 4: CALCULATION PARAMETERS

Table 7: Financial parameters used on financial analysis of Cosipar project.

FINANCIAL ANALYSIS PARAMETERS	
I) Electricity generation	
Tariff (U$/MWh)*	39,50
VAT**	25%
Price of carbon (U$/tCO2)*	6,00
Pre-operational Costs**	50.000
Investment**	5.048.426
Eletricity Plant - Operating Costs ($/MWh)**	7,93
Carbon Offset Monitoring and verification*	20.000
Insurance*	2%
Contingencies*	5%
Depreciation*	10%
Income tax**	33%
Discount rate**	12%

Sources:
*ESL data
**Cosipar data