CLEAN DEVELOPMENT MECHANISM
SIMPLIFIED PROJECT DESIGN DOCUMENT
FOR SMALL-SCALE PROJECT ACTIVITIES (SSC-CDM-PDD)
Version 02

CONTENTS

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>.

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

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

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JOSAPAR Pelotas Biomass Electricity Generation Project

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

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Purpose

The JOSAPAR Pelotas Biomass Electricity Generation Project developed by JOSAPAR is a project for installation in the Pelotas city, Rio Grande do Sul state, Brazil. JOSAPAR is a rice mill company, of which the core business is the production of paddy and parboiled rice to internal and exporting markets. JOSAPAR is placed 2nd company in the ranking of rice companies 2005 (Brazilian Rice Year Book 2005, pg. 59)[1].

The project eliminates JOSAPAR's electricity demand from the grid, will sell the small surplus generated electricity to the grid and provide process steam to the rice mill.

Project description

The main activity in the region where the project will be located is rice production and industrialization. Rice mills generate huge amounts of biomass residues (rice husks), and the Brazilian and local state legislation prohibits the unlicensed displacement and/or uncontrolled burning of rice husks, and restricts the land filling of it, allowing the displacement only in previously licensed areas. As a result, the rice mills have huge amounts of biomass that are left for decay.

The JOSAPAR project will be the solution for the high costs associated to electricity consumption in rice production. A better quality and control of the steam supplied to the process is targeted with the project implementation.

The JOSAPAR's project consists of a turn-key biomass electricity co-generation unit, with 8 MWe and 17.6 $MW_{thermal}$ of installed capacity using only rice husks as fuel, complying with all the JOSAPAR's demand and exporting the surplus power to the grid. With this new thermal power plant, JOSAPAR will deactivate the old boiler used only to produce process steam. This old boiler already uses biomass as fuel but it does not generate electricity.

The only biomass that JOSAPAR is going to use are its own rice mill residues as fuel for the boiler. The amount of biomass used by third suppliers is null, once the company doesn't depend on external sources of biomass to maintain the power plant fully operational. Internal transportation of the fuel is facilitated by electrical screws, conveyors and elevators.

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[1] Rosa, Gilson R. Da Et. Al., Anuário Brasileiro do Arroz 2005, Gazeta Santa Cruz, Santa Cruz do Sul, Brasil, 2005, pg 59

At the present time a considerable amount of surplus rice husks of the company is sold for other companies in the region, which is used to replace wood used at other companies' boilers. The project activity avoids the emissions related to the transport of 22 trucks of rice husks per day, but causes emissions related to a much smaller number of trucks for ash removal. The net avoided transportation emissions caused by use of fossil fuels have been calculated, but not considered in the project.

Contribution of the project to sustainable development
The project is promoting sustainable development to the Host Country, providing:

- Increases in employment in the area where the plant is located;
- Diversification in the sources of electricity generation;
- Uses of clean and efficient technologies, and conserving natural resources, thus the project will be meeting the Agenda 21 and Sustainable Development Criteria of Brazil;
- Actions as a clean technology demonstration project, encouraging development of modern and more efficient generation of electricity and thermal energy using biomass fuel throughout the Country;
- Optimisation in the use of natural resources, avoid new uncontrolled waste disposal places, using a large amount of rice residues from region.

A.3. Project participants:
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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)	JOSAPAR – Joaquim Oliveira Participações S.A.	No
Brazil (host)	PTZ BioEnergy Ltd.	No
The Netherlands	Bioheat International B.V.	No

(*)In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.

A.4. Technical description of the small-scale project activity:
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A.4.1. Location of the small-scale project activity:
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A.4.1.1. Host Party(ies):
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Brazil

A.4.1.2. Region/State/Province etc.:
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Rio Grande do Sul State

A.4.1.3. City/Town/Community etc:
>>

Pelotas

A.4.1.4. Detail of physical location, including information allowing the unique identification of this small-scale project activity(ies):
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JOSAPAR-Pelotas rice mill is located in Pelotas City, in the southern region of Rio Grande do Sul State. Address: BR 116, km 512, 240 Km from Porto Alegre, the capital city of the state.

A.4.2. Type and category(ies) and technology of the small-scale project activity:
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As per appendix B of the simplified modalities and procedures for small-scale CDM project activities, the project activity falls under the following category:

Type I; Category I.D.: Grid connected renewable electricity generation

Reference: version 07: 28 November 2005 of Appendix B of the simplified modalities and procedures for small scale CDM project activities.

Justification of how the proposed CDM project adheres to the applicability criteria of the selected project categories.

Type I; Category I.D.: Grid connected renewable electricity generation
Type I
Type I project activities are defined as renewable energy project activities with a maximum output capacity equivalent to up to 15 megawatts (or an appropriate equivalent) (decision 17/CP.7, paragraph 6 (c) (i)).

The project comprises combustion of renewable rice husks in a biomass boiler for electricity generation. The nominal capacity of the installation is 8,0 MWe, which is below the limit for type I projects.

Category I.D.
The applicability criteria of the Category I.D. 'Grid connected renewable electricity generation' are:
Technology/measure
1. This category comprises renewable energy generation units, such as photovoltaics, hydro, tidal/wave, wind, geothermal, and renewable biomass, that supply electricity to and/or displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel or non-renewable biomass fired generating unit.
2. If the unit added has both renewable and non-renewable components (e.g.. a wind/diesel unit), the eligibility limit of 15MW for a small-scale CDM project activity applies only to the renewable component. If the unit added co-fires non-renewable biomass or fossil fuel, the capacity of the entire unit shall not exceed the limit of 15MW.

3. Biomass combined heat and power (co-generation) systems that supply electricity to and/or displace electricity from a grid are included in this category. To qualify under this category, the sum of all forms of energy output shall not exceed 45 MWthermal. E.g., for a biomass based co-generating system the rating for all the boilers combined shall not exceed 45 MWthermal.

The project conforms to the above mentioned conditions in the following ways:
1. The project comprises the use of rice husks, which is a renewable biomass to be used to supply electricity to and/or displace electricity from the electricity distribution system of Rio Grande do Sul. Rio Grande do Sul and Santa Catarina States are the only two states in Brazil who presents coal fired power plants complementing the energy demand in the integrated electrical south Brazilian grid. Thus the project activity replaces the use of at least one fossil fuel.
2. The unit uses only rice husks, which is a renewable biomass.
3. The plant has a maximum output of heat (17.6 MWth) and power (8.0 MWe). The sum of these outputs is below the limit of 45 MWthermal.

It is concluded that category AMS I.D. is applicable to the small scale project activity.

Use of environmentally sound technologies and transfer of know how
The JOSAPAR project will operate using state of art conventional Rankine steam cycle technology. The combustion of the fuel will be performed with proven technologies like a high pressured boiler (65 bar). The power plant control is supervised by a high standard automation set of LPCs and computers.

A condensing steam turbine drives an electrical generator. The energy is managed by control panels and devices that keep a steady condition of voltage, frequency and load. Under current operational conditions, the boiler produces up to 40,000 kg/h of steam at 65 bar and 520°C while it consumes 11.0 t/h of rice husks. The steam feeds a multistage steam condensing turbine at 0.09 bar. Before the turbine inlet, up to 50% of total steam generated is deviated to process heat. The steam turbine drives a 3 phase synchronous generator producing up to 8,000 kWe at 13,800 V and 60 Hz.

An integration panel allows synchronicity and full load control for the auxiliary power plant services, rice mill and export to the grid. Electricity is sent to the utility distribution lines through a transformer of 13.8 kV. The project already has obtained all necessary licences to be installed and complies with the Brazilian and State environmental standards, mainly regarding to the control flue gas emissions and wastes. The ash from the plant will be sold as a beneficial by-product.

The project uses the above described environmentally safe and sound technology, which leads to utilization of husks otherwise left for decay and replacement of carbon based electricity generation. PTZ Bioenergy Ltd already has accumulated a large experience in engineering, projecting and constructing power plants at rice industries with conventional high pressure boilers in co-generation, with a similar concept of process engineering. Similar technology has been used by PTZ to combust rice husks at the CAMIL rice mill project (2001), a 4.2 MWe power plant in Itaqui-RS, Brazil, and a 3.0 MWe project at the URBANO rice mill Project (1999) in Jaraguá do Sul city, Santa Catarina State, Brazil, differing only in the equipment's scale.

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

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The proposed small-scale project activity reduces carbon emissions by replacement of fossil fuel based electricity generation, and prevents rice husks to be left to decay.

In absence of the project activity, carbon emissions from fossil fuel based electricity generation would have occurred.
Rio Grande do Sul and Santa Catarina States are the only two states in Brazil that use coal fired thermal power plants complementing the energy demand in the integrated electrical south Brazilian grid. By the replacement of power from the grid and by supply of electricity to the grid, carbon from the coal combustion in electricity plants is avoided. The grid emission factor was calculated in a transparent way, using the most recent data from ONS[2], Eletrobrás[3] and ANEEL[4] corresponding to the south-southeast-midwest Brazilian interconnected Electrical System. The carbon emission factor obtained was 0,463 tonnes of CO_2/MWh. Full details about calculation methods are presented in the confidential PTZ's document: "Fator de Redução de Emissões no Grid Interconectado do Sistema Sul-Sudeste-Centro-Oeste".

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

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Table 1: Net emission reduction by the grid connected electricity generation (tonnes CO2 equivalent per year)

	Type I.D grid connected electricity generation		
Year	Baseline emissions (A)	Project emissions (B)	Net emission reduction (A-B)
1 Apr - 31 Dec 2008	**14,932**	**0**	**14,932**
2009	**19,909**	**0**	**19,909**
2010	**19,909**	**0**	**19,909**
2011	**19,909**	**0**	**19,909**
2012	**19,909**	**0**	**19,909**
2013	**19,909**	**0**	**19,909**
2014	**19,909**	**0**	**19,909**
1 Jan - 31 Mar 2015	**4,977**	**0**	**4,977**
Total estimated reductions	**139,363**	**0**	**139,363**
Total number of crediting years	**7**	**7**	**7**
Annual average over the first crediting period of estimated reductions (tonnes of CO_2 e)	**19,909**	**0**	**19,909**

[2] Operador Nacional do Sistema Elétrico - Dados Relevantes do Ano de 2003 (www.ons.org.br)

[3] Eletrobrás – Sistemas Interligados, Acompanhamento de Combustíveis; (www.eletrobras.gov.br)

[4] Agência Nacional de Energia Elétrica - Banco de Informações de Geração (www.aneel.gov.br)

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

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There has been no public funding to the project.

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

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According to paragraph 2 of Appendix C to the Simplified Modalities and Procedures for Small-Scale CDM project activities, a small-scale project is considered a debundled component of a large project activity if there is a registered small-scale activity or an application to register another small-scale activity:

- With the same project participants;
- In the same project category and technology/measure; and
- Registered within the previous 2 years; and
- Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point.

There is no other small-scale activity that meets the above mentioned criteria. Accordingly, the proposed project activity is not a debundled component of a larger project activity.

SECTION B. Application of a baseline methodology:

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

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Type I; Category I.D.: Grid connected renewable electricity generation

Reference: Appendix B of the simplified modalities and procedures for small scale CDM project activities (version 07: 28 November 2005).

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

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The applicability criteria of the Category I.D. 'Grid connected renewable electricity generation' are:
Technology/measure
1. This category comprises renewable energy generation units, such as photovoltaics, hydro, tidal/wave, wind, geothermal, and renewable biomass, that supply electricity to and/or displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel or non-renewable biomass fired generating unit.
2. If the unit added has both renewable and non-renewable components (e.g.. a wind/diesel unit), the eligibility limit of 15MW for a small-scale CDM project activity applies only to the renewable

component. If the unit added co-fires non-renewable biomass or fossil fuel, the capacity of the entire unit shall not exceed the limit of 15MW.
3. Biomass combined heat and power (co-generation) systems that supply electricity to and/or displace electricity from a grid are included in this category. To qualify under this category, the sum of all forms of energy output shall not exceed 45 MWthermal. E.g., for a biomass based co-generating system the rating for all the boilers combined shall not exceed 45 MWthermal.

The project conforms to the above mentioned conditions in the following ways:
1. The project comprises the use of rice husks, which is a renewable biomass to be used to supply electricity to and/or displace electricity from the electricity distribution system of Rio Grande do Sul. Rio Grande do Sul and Santa Catarina States are the only two states in Brazil who presents coal fired power plants complementing the energy demand in the integrated electrical south Brazilian grid. Thus the project activity replaces the use of at least one fossil fuel.
2. The unit uses only rice husks, which is renewable biomass.
3. The plant has a maximum output of heat (17.6 MWth) and power (8.0 MWe). The sum of these outputs is below the limit of 45 MWthermal.

It is concluded that project category I.D is applicable to the small-scale project activity.

Assumptions of the baseline methodology
To estimate the baseline emissions related to grid connected renewable electricity generation the baseline calculations as indicated under category I.D. of Appendix B are applied. This methodology allows to calculate the baseline emissions by either using *the average of the approximate "operating margin" and the "build margin"* or taking *the weighted average emissions of the current generation mix.* It was decided to calculate the baseline emissions by using the average of the approximate "operating margin" and the "build margin".

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

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Attachment A to Appendix B indicated that project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers:
(a) Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions;
(b) Technological barrier: 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: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;
(d) Other barriers: 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.

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

<u>Scenario 1 - Continuation of current activities</u>

This scenario represents continuation of the current practices. No electricity is produced with rice husks, consequently all needed -fossil fuel based- electricity is delivered by the grid.

Scenario 2 - Construction of a renewable energy plant

In this scenario, the JOSAPAR biomass electricity generation plant is established. Rice husks will be used to produce heat and power. The power replaces fossil fuel based power formerly delivered by the grid. In addition surplus power will be delivered to the grid, thereby replacing fossil fuel based electricity.

With respect to the **financial** barrier:

- 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 the capital costs related to biomass units are very high. 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 subsides or promotional support for the implementation of independent renewable energy plants.

  The financial barrier is demonstrated through a financial analysis, which the results are presented in table 2 below. The carbon revenues increase the returns of the project transforming this into an attractive investment for the company and financial agents.

Table 2: Financial Analysis Results

	With Carbon	Without Carbon
Net Present Value ($)	908,288.25	251,561.84
IRR	13.4%	10.72%
Discount Rate	13.75%	
Present Value of carbon sold (21 years) $	2,717,578.50	

With respect to the **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 commercially proven, and have been used effectively in the Host Country.

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. Moreover, and as mentioned in section A.4.4, Brazil has a huge rice industry, with more than 350 rice mills. A considerable fraction, about 60%, of rice production is located in the south region (IRGA 2004)[5]. The south Brazilian region, i.e. the states of

[5] RUCATTI, Evely Gischkow, KAYSER, Victor Hugo, 2004. Produção e Disponibilidade de Arroz por Região Brasileira Instituto Riograndense do Arroz. Rio Grande do Sul, Brasil.

Rio Grande do Sul, Santa Catarina and Paraná, have no recorded problems with power supply, even along the electricity crisis observed at 2001. Environmental agencies have been approving new areas for disposing the industrial residues, as rice husks, with clear and effective rules, in such a way that only the distance, and by consequence the costs, will represent obstacles for taking the residues into consideration as a pressure to perform future projects.

- The Brazilian technologies in rice mills are very updated with global technologies employed, representing the state of art on rice mills technology. The efficiency of the process reaches around 98% of the commercial matter in the grain. Usually 78% of the rice is transformed in products. The other 22-23% are rice residues. Given the large number of rice mills in the south region the biomass residue generation is concentrated in the south region, creating an excess of biomass residues that the market cannot absorb. According to CIENTEC[6] more than 59,60 % of residues are not used or sold. Currently only 6 small-scale power plants operate at the south region of Brazil. From 2002, no new plants were build, mainly due to the lack of feasibility. Thus, there are many large biomass piles that are left for decay, generating methane during this process.

- The construction of a new renewable energy plant (Scenario 2) doesn't represent a deviation from the company's core business (rice production) once the energy costs avoided will be utilized to sell beneficed rice for a lower price or to increment the profit margin of the product. Therefore, the steam generated by the boiler will be used to achieve a higher quality in the rice process. Currently JOSAPAR has a great amount of rice husks that guaranties the supply for the future plant.

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

- In case of scenario 1, no other barriers were identified.
- In case of scenario 2, no other barriers were identified.

Table 3 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 the financial/economic barrier.

Table 3: Summary of Barriers Analysis

Barrier Evaluated	Scenario 1 Continuation of Current Activities	Scenario 2 Construction of a new plant
1. Investment barrier	No	Yes
2. Technological barrier	No	No
3. Prevailing practice	No	No
4. Other barriers	No	No

Because the investment barrier would prevent that the project would have occurred anyway, it is concluded that the project is additional.

[6] CIENTEC, 1986. Programa Energia: Aproveitamento Energético da Casca de Arroz. Relatório do Projeto de Pesquisa. Porto Alegre, Fundação de Ciência e Tecnologia.

The implementation of the project will eliminate the amount of biomass disposed in the landfills as well as the energy consumed from the grid, consequently reducing the CO_2 emissions, as showed in the following analysis:

- The Baseline Scenario is represented by an old boiler that provides process steam and steam for the rice drying process. This boiler consumes 6,540 tonnes of rice husks per year, 16,9% of total production. The surplus of biomass, nearly 32,175 tonnes, is sold to industrial plants, to burn in his boilers, only for heat generation in substitution of wood. The industry will continue to use energy from the grid that have a production of CO_2 associated to the MWh produced.

- The Project Scenario is represented by the construction of a new renewable energy plant of 8,0 MWe. This implementation will imply in substitution of the old boiler by a new boiler that will provide steam for the drying rice process, process heat and power generation. The expected amount of rice husks consumed will be 59,125 tonnes per year. The energy imported from the grid, which is partly generated by fossil fuels, will be displaced, contributing to GHG emission reductions. The rice husks transportation will be decreased as well as ash generation will be increased, resulting in a final balance where the diesel consumption is reduced and, consequently, the CO_2 equivalent emissions.

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

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According to category I.D. the project boundary encompasses the physical, geographical site of the renewable generation source.
The rice husks are combusted for electricity generation at the site of the rice mill. This is also the location where the rice husks are produced from the rice milling process.

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

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The baseline for grid connected renewable electricity generation is based on methodology AMS I.D. of annex B of the simplified modalities and procedures for small-scale CDM project activities (Version 07: 28 November 2005). The baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient, calculated in a transparent and conservative manner as the average of the approximate operating margin and the build margin.

Date of completion
20/01/2006

Name of person/entity determining the baseline:

- Ricardo Pretz and Ronaldo Hoffmann from PTZ Bioenergy Ltda and;
- Martijn Vis and René Venendaal from BTG biomass technology group B.V.

Contact details are listed in annex I.

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

C.1. Duration of the small-scale project activity:
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C.1.1. Starting date of the small-scale project activity:
>>

01/02/2007

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

30 years

C.2. Choice of crediting period and related information:
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C.2.1. Renewable crediting period:
>>

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

01/04/2008

C.2.1.2. Length of the first crediting period:
>>

7 years, 0 months

C.2.2. Fixed crediting period:
>>

C.2.2.1. Starting date:
>>

C.2.2.2. Length:
>>

SECTION D. Application of a monitoring methodology and plan:

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

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Monitoring methodology of category I.D. as described in 'Appendix B of the simplified modalities and procedures for small-scale CDM project activities' (Version 07: 28 November 2005)

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

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The monitoring methodology of category I.D. describes that: *Monitoring shall consist of metering the electricity generated by the renewable technology. In the case of co-fired plants, the amount of biomass and fossil fuel input shall be monitored.*

Conform the monitoring methodology, the monitoring plan foresees in the metering of electricity generated by the rice husk combustion installation. It is an effective and reliable way to measure the replaced electricity from the grid.

D.3 Data to be monitored:

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Table 4: D 3.1 Data to be collected necessary for determining the baseline of anthropogenic emissions and the project emissions and how this data will be archived, related to project category I.D. ' grid connected electricity generation':

ID-number	*Data variable*	*Source of data*	*Data unit*	*Measured (m), calculated (c) or estimated (e)*	*Recording frequency*	*Proportion of data to be monitored*	*How will the data be archived? (Electronic/ paper)*	*Comment*
D.3.1	Electricity imported from the grid	Electricity ingress register and electricity bills	KWh	m	Continuous and monthly	100%	Electronic and paper	The electricity imported from the grid is monitored by an energy ingress register and by the energy bills expedited monthly by the electricity concessionary
D.3.2	Gross electricity generated by the project	Electronic supervisory system of the biomass power plant.	KWh	m	Continuous	100%	Electronic and paper	The gross electricity generated by the project activity (electricity delivered to the grid and delivered to the own rice mill) is recorded in the electronic supervisory system of the power plant.
D.3.3	Net electricity delivered to the grid	Electronic supervisory system of the biomass power plant.	KWh	m	Continuous	100%	Electronic and paper	The net electricity delivered to the grid is recorded in the electronic supervisory system of the power plant.

D 3.4	Baseline emission factor	ONS , Eletrobrás and ANEEL	tonnes CO_2/ MWh	c	Yearly	100%	Electronic and paper	Baseline emission factor consists of Operating Margin emission factor and Build Margin emission factor, and calculated from the installed capacity, carbon emission factor , electricity production and fuel consumption of the electricity generation plants connected to the south-southeast-midwest interconnected grid.

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

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Table 5: D. 4.1 Quality control (QC) and quality assurance (QA) procedures are being undertaken for data monitored, related to category I.D.		
ID number	*Uncertainty level of data (High/Medium/Low)*	*Explain QA/QC procedures planned for these data, or why such procedures are not necessary.*
D.3.1	Low	The information read by the electricity ingress register will be double checked with the monthly electricity bill expedited monthly by the electricity concessionary.
D.3.2	Low	The electric measurement equipment will comply with Standards for Electricity NBR 5410, Grid proceedings from Brazilian ONS. Standards for connection are established by grid companies during licensing. According to the Brazilian Regulations on electrical Grid, additional measurements are demanded by the ANEEL (National Electric Energy Agency) and the company that owns the rights of grid distribution, in such a way at least two supplementary conventional electronic measurers should be installed at the outlet cabin. The 3 systems will be checked in a monthly basis.
D.3.3	Low	See D.3.1.
D.3.4	Low	Values based on info provided by ONS , Eletrobrás and ANEEL. All calculations are internally double-checked.

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

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JOSAPAR – Joaquim Oliveira S.A. Participações (JOSAPAR), PTZ Bioenergy Ltda (fully and exclusively authorized to act on the behalf of JOSAPAR regarding this CDM project) and BioHeat International (exclusively authorized to sell the carbon credits from the JOSAPAR Pelotas project) are all project participants.

JOSAPAR operates the plant that is part of the project and will measure the required monitoring data related to the project and is qualified to do so. PTZ is responsible for interpretation of the monitoring data, and leakage effects, preparation of the monitoring reports and quality assurance. If required, PTZ will provide instructions and training to operators of JOSAPAR.

Additional information regarding project management planning i.e. Project organization, communication, data processing & quality management, calibration of monitoring equipment and troubleshooting procedures are provided to the DOE.

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

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- PTZ Bioenergy Ltd. and;
- BTG Biomass Technology Group b.v

The monitoring methodology was prepared by Ricardo Pretz and Ronaldo Hoffmann, of PTZ, as well as Rene Venendaal and Martijn Vis of BTG.

SECTION E.: Estimation of GHG emissions by sources:

E.1. Formulae used:

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E.1.1 Selected formulae as provided in appendix B:

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Category I.D.

No formula is provided to quantify the emission reduction of electricity generation in the Baseline of category I.D. of appendix B. In words it is described that:

Baseline emissions

(…) the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO_2equ/kWh) calculated in a transparent and conservative manner as:

(a) The average of the "approximate operating margin" and the "build margin", where:

(i) The "approximate operating margin" is the weighted average emissions (in kg CO_2equ/kWh) of all generating sources serving the system, excluding hydro, geothermal, wind, low-cost biomass, nuclear and solar generation;

(ii) The "build margin" is the weighted average emissions (in kg CO2equ/kWh) of recent capacity additions to the system, which capacity additions are defined as the greater (in MWh) of most recent 20% of existing plants or the 5 most recent plants.";

OR,

(b) The weighted average emissions (in kg CO_2equ/kWh) of the current generation mix.

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

>>

Formulae not provided in appendix B, related to the methodology described in category I.D.

The baseline emissions (*BEy*) resulting from the electricity supplied and/or not consumed from the grid is calculated as follows, where *EGy* is the annual net electricity generated from the Project.

$$BEy = EGy*EFy$$

The baseline emissions factor (*EFy)* is a weighted average of the *EF_OMy* and *EF_BMy:*

$$EFy = (\omega_{OM} * EF\_OMy) + (\omega_{BM} * EF\_BMy)$$

where the weights ω_{OM} and ω_{BM} are by default 0.5.

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

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

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 mustrun 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:

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

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

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:

>>

Category I.D.

The project emissions are negligible and not taken into account.

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

>>

Category I.D.
No leakage calculation is required, as the renewable energy technology used is not equipment transferred from another activity.

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

>>

Category I.D.
The small scale project emissions are zero.

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

>>

Category I.D.

The baseline emissions for grid connected electricity generation are described as follows:

$BE_{el} = EGy * EFy$

where,

BE_{el} = Baseline Emissions of electricity generation (tonnes CO_{2equ})

EGy = Electricity production by project activity (MWh).

EFy = Emission Coefficient (measured in tonnes CO_2equ/MWh)

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:

>>

Category I.D.

Emission reduction by grid connected renewable electricity production during a given period equals:

$ER_{ID} = BE_{el}$

where,

ER_{ID} = emission reduction due to grid connected renewable electricity production (tonnes CO_{2equ})

BE_{el} = Baseline Emissions of electricity generation (tonnes CO_{2equ})

Remark: formulae can be used for any given time period. It should be stated clearly what time period is meant.

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

>>

Table 6: Emission reduction by grid connected electricity generation

Indicator	**Abbreviation**	**Value**	**Unit**
Operating margin emission factor	EF_OMy	0.847	tonnes CO_2/MWh
Build margin emission factor	EF_BM_y	0.079	tonnes CO_2/MWh
Baseline emission factor	EFy	0.463	tonnes CO_2/MWh
Annual net electricity generated by the Project	EGy	43,000	MWh
Baseline emissions	BE_{el}	19,909	tonnes CO_2/year
Project emissions	n.a.	0	tonnes CO_2/year
Emission reduction from electricity generation	ER_{ID}	19,909	tonnes CO_2/year

Table 7: Net emission reduction by the grid connected electricity generation (tonnes CO_2 equivalent per calendar year)

	Type I.D grid connected electricity generation		
Year	Baseline emissions (A)	Project emissions (B)	Net emission reduction (A-B)
1 Apr - 31 Dec 2008	**14,932**	**0**	**14,932**
2009	**19,909**	**0**	**19,909**
2010	**19,909**	**0**	**19,909**
2011	**19,909**	**0**	**19,909**
2012	**19,909**	**0**	**19,909**
2013	**19,909**	**0**	**19,909**
2014	**19,909**	**0**	**19,909**
1 Jan - 31 Mar 2015	**4,977**	**0**	**4,977**
Total estimated reductions	**139,363**	**0**	**139,363**
Total number of crediting years	**7**	**7**	**7**
Annual average over the first crediting period of estimated reductions (tonnes of CO_2 e)	**19,909**	**0**	**19,909**

SECTION F. Environmental impacts

F.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:

Documentation

The renewable energy plant has received permit for construction from ANEEL, the Brazilian electricity energy National Agency (License ANEEL n°123, published in the Brazilian Official Diary, n° 45 section 1, 7th March 2002)

The environmental permit for operation from the Environmental Agency of Rio Grande do Sul State (FEPAM – Fundação Estadual de Proteção Ambiental) has the number 4361, and it was issued on 6th April 2004, and is valid until 6th April 2006. The JOSAPAR rice mil is accomplished to local environmental license, in such a way, it has authorization for operation according the law.

Renewable electricity generation

The project will contribute to displace more carbon-intensive electricity generation sources from the South-Southeast grid, promoting the use of renewable fuels (biomass) for electricity generation.

Rice husks

The project will improve the local environmental condition due to the adequate treatment of rice husks residues. Currently these residues are a problem because they are left decomposing in landfills, releasing methane emissions to the atmosphere.

SECTION G. Stakeholders' comments:

G.1. Brief description of how 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, 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 Pelotas;
- Chamber of Pelotas;
- Environment agencies from the state and Local Authority;
- 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.

Local stakeholders were invited to raise their concerns and provide comments on the project activity for a period of 30 days after receiving the letter of invitation. PTZ Bioenergy and the project developer addressed questions raised by stakeholders during this period.

G.2. Summary of the comments received:

To date, no comments have been received.

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

To date, no comments have been received.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Project participant

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

This project will not receive any public funds.

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Annex 3

BASELINE INFORMATION

The grid factor calculation was conduced with the following databases:

- Electricity Generated at 2003 (MWh):

Operador Nacional do Sistema Elétrico. Centro Nacional de Operação do Sistema. Acompanhamento Diário da Operação do SIN (www.ons.org.br)

- Efficiency for thermal power plants:

Thermal Power Plant	Efficiency calculation sources
Jorge Lacerda A	Eletrobrás[1] and CIMGC[2]
Jorge Lacerda B	Eletrobrás and CIMGC
Jorge Lacerda C	Eletrobrás and CIMC
Charqueadas	Eletrobrás and CIMGC
P.Medice A	Eletrobrás and CIMGC
P. Medice B	Eletrobrás and CIMGC
P. Medice (A+B)	Eletrobrás and CIMGC
São Jeronimo	Eletrobrás and CIMGC
Figueira	Eletrobrás and CIMGC
Santa Cruz	Eletrobrás and CIMGC
Igarapé	Eletrobrás and CIMGC
Piratininga	Eletrobrás and CIMGC
Nova Piratininga	Eletrobrás and CIMGC

For the other efficiency inputs the Executive Board recommended values were used just for the Build Margin calculation. For the Operating Margin the values adopted were the average as described in the OECD information paper (Bosi, 2002)[3].

The spreadsheets containing the efficiency and the grid factor calculations are confidential files and are available only for authorized persons.

[1] Eletrobrás – http://www.eletrobras.gov.br/EM_atuacao_ccc/default.asp

[2] Comissão Interministerial de Mudança Global do Clima – CIMGC; Análise sobre o Setor Energético na Região Sul: www.mct.gov.br/clima/comunic_old/energi41.htm#index

[3] Bosi, M., A. Laurence, P. Maldonado, R. Schaeffer, A.F. Simoes, H. Winkler and J.M. Lukamba. Road testing baselines for GHG mitigation projects in the electric power sector. OECD/IEA information paper, October 2002.

Biomass and electricity aspects in the JOSAPAR Pelotas Biomass Electricity Generation Project

Year	Electricity generated/year (MWh)	Amount of rice husks produced (kg/year)	Amount of rice husks consumed (kg/year)	Amount of rice husks sold to third parties (kg/year)	% Consumed
2006	-	38,715,000	6,540,000	32,175,000	16,9%
2007	32,250	59,125,000	44,343,750	14,781,250	75%
2008	43,000	59,125,000	59,125,000	0	100%
2009	43,000	59,125,000	59,125,000	0	100%
2010	43,000	59,125,000	59,125,000	0	100%
2011	43,000	59,125,000	59,125,000	0	100%
2012	43,000	59,125,000	59,125,000	0	100%
2013	43,000	59,125,000	59,125,000	0	100%
2014	43,000	59,125,000	59,125,000	0	100%
2015	43,000	59,125,000	59,125,000	0	100%
2016	43,000	59,125,000	59,125,000	0	100%
2017	43,000	59,125,000	59,125,000	0	100%
2018	43,000	59,125,000	59,125,000	0	100%