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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URBANO Sinop Biomass Electricity Generation project

A.2. Description of the small-scale project activity:
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Purpose
The URBANO Sinop Biomass Electricity Generation Project developed by URBANO is a biomass electicity generation in Sinop city, Mato Grosso state, Brazil, that will eliminate Urbano's electricity demand from the grid, will sell the small surplus generated electricity to the grid and provide process steam to the rice mill. The purpose of the project is to avoid methane emissions due to the decay of unutilised rice husks and to avoid carbon emissions related to electricity generation for the grid.

Project description
URBANO is a rice mill company, of which the core business is the production of paddy and parboiled rice to the internal market in Brazil. Urbano is ranked as the third biggest rice company in Brazil. (Brazilian Rice Year Book 2005)[1].

The main activity in the region where the project will be located is agriculture. Soil bean, cotton and rice cultures prevail. Rice industries started to install and operate at Mato Grosso since the 80's. Urbano installed its 4th unit in 2003.

The rice mills generates 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 landfilling of it, allowing the displacement only in previously licensed areas. As a result, the rice mills have huge amount of biomass that are left for decay.

The URBANO project will be a solution for the high costs associated to electricity in rice production, and will improve the quality of electricity at the Urbano's plant. A better quality and control for the steam supplied to the process is targeted with the project implementation.

The URBANO project consists in the construction of a biomass electricity co-generation unit of 3 MWe installed capacity using only rice husks residues as fuel, complying with URBANO's energy demand and exporting the surplus power to the grid. With this new thermal power plant, URBANO will deactivate the old boiler that is used only to produce process steam. This old boiler already uses biomass as a fuel but it does not generate electricity. URBANO has an identical power plant 3 MWe installed at its headquarters in Santa Catarina state in operation since 1999.

The only type of biomass that URBANO 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

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

external sources of biomass to maintain the power plant fully operational. Internal transportation of the fuel is facilitated by electrical screws, conveyors and elevators.

As far all the big rice mills, URBANO generates a substantial amount of rice husks that is disposed on lands located in the rural areas. This amount of residues represents for around 137 trucks of husks per month. The expected reduction of transportation emissions caused by the use of fossil fuels has been calculated, but not considered in the project, including the emissions resulting from transportation of ash from the project.

Contribution of the project to sustainable development
The project will help the Host Country fulfil its goals of promoting sustainable development.
Specifically, the project:

- Increases in employment opportunities in the area where the plant is located;
- Diversifies the sources of electricity generation;
- Uses clean and efficient technologies, and conserves 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;
- Optimises 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)	Urbano Agroindustrial Ltda	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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Mato Grosso State

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

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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The project is located in URBANO, situated in the municipality of Sinop, Mato Grosso state. Address: BR 163, Km 846, Sinop, Mato Grosso state, CEP 78550-000.

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 two categories:

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

Type III; Category III.E.: Avoidance of methane production from biomass decay through controlled combustion.

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

A bundle is formed of small-scale project activities of different types (type I and type III) as to both reduce carbon emissions by replacement of electricity from the grid and to avoid the decay of rice husks through controlled combustion, thereby following the rules and principles as indicated 'EB 21 Report, annex 21, general principles for bundling' and 'Guidelines for completing the simplified project design document (CDM-SCC-PDD) and the form for submissions on methodologies for small-scale CDM project activities (F-CDM-SSC-Subm) (version 01)'.

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

<u>Type I; Category I.D.: Grid connected renewable electricity generation</u>
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 3.0 MWe, which is below the limit of 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 renewable biomass.
3. The plant has a maximum output of heat (11.9 MWth) and power (3.0 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.

Type III; Category III.E.: Avoidance of methane production from biomass decay through controlled combustion.
Type III project activities are defined as other project activities that both reduce anthropogenic emissions by sources and directly emit less than 15 kilotonnes of carbon dioxide equivalent annually (decision 17/CP.7, paragraph 6 (c) (iii) .

The applicability criteria of the Category III.E. 'Avoidance of methane production from biomass decay through controlled combustion' are:
Technology/measure
1. This project category comprises measures that avoid the production of methane from biomass or other organic matter that would have otherwise been left to decay as a result of anthropogenic activity. Due to the project activity, decay is prevented through controlled combustion and less methane is produced and emitted to the atmosphere. The project activity does not recover or combust methane (unlike III D). Measures shall both reduce anthropogenic emissions by sources, and directly emit less than 15 kilotonnes of carbon dioxide equivalent annually.

Decay is prevented through controlled combustion of rice husks and less methane is produced and emitted to the atmosphere. The direct carbon emissions are related to the emission of methane and nitrous oxide by combustion of the rice husks, which is maximally 1,273 tonnes of carbon dioxide equivalent annually. Therefore, project emissions leads to direct carbon emissions of less than 15 kilo tonnes of carbon dioxide equivalent annually.

It is concluded that category AMS III.E. is applicable to the small scale project activity.

Use of environmentally sound technologies and transfer of know how
Commercially state of art conventional Rankine steam cycle technology will be used. The combustion of the fuel will be performed with proven technologies in a medium pressured boiler (21 bar). The power plant control will be supervised by a high standard set of LPCs and computers, composing the automation system.

The energy production and supply will be managed by control panels and devices that keep a steady condition of Voltage, frequency and load.

Under fully operational conditions, the boiler will produce approximately 25t/h of steam at 21 bar and 330°C while consuming 5.3 t/h of rice husks. The steam will be fed to a multistage steam condensing turbine at 0.15 bar with extraction. A controlled extraction will provide up to 15t/h of low pressure steam for general process heat. The steam turbine will drive a three phase synchronous generator producing up to 3.000 kWe at 13.8kV and 60 Hz. A recovery boiler in the flue gas steam will generate low pressure untreated steam for direct injection over the rice in the parboiled process.

An integration panel will allow synchronicity and full load control for the auxiliary power plant services, rice mill and export to the grid. Electricity will be sent to the utility distribution lines through a transformer of 13,8 kV. The plan where the project will be installed already has obtained all necessary licences to operate and complies with the Brazilians and State environmental standards, mainly regarding to the control flue gas emissions and wastes. The Power plant licence is under registration at FEMA (State Foundation of Environmental Protection). 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 similar concept of process engineering. Similar technology has been used by PTZ to burn rice husks at CAMIL rice mill project (2001), a 4.2 MWe power plant in Itaqui-RS, Brasil, and a 3.0 MW 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.

The secondary energy production grew significantly, among the period of 1995-2001, at a medium annual tax of 21.1%, due the rise of the electricity production in the years of 2000 and 2001, resulting from the beginning of operation of the "Mario Covas" thermoelectric plant, located in Cuiabá (BEEMT,2002)[2]. Also there is a considerable amount of electricity generated by diesel sources in Sinop city. Those characteristics demonstrate a relevant carbon participation in the electricity production of the region. The grid emission factor was calculated in a transparent way, using the most recent data from ONS[3], Eletrobrás[4] and ANEEL[5] 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 document: "Fator de Redução de Emissões no Grid Interconectado do Sistema Sul-Sudeste-Centro-Oeste".

In absence of the project activity the rice husks would have been left to decay

In 2004/2005 rice harvesting season, Mato Grosso produced around 2 millions of tonnes of rice corresponding to 16% of total rice production of Brazil and 77% of the mid-west of the country (Brazilian Rice Year Book 2005)[1]. Table 1 shows the amount of rice husks produced in Brazil and Mata Grosso in 2004/2005. Every tonne of rice production leads to the supply of 0.22 tonne of rice husks. (CIENTEC, 1986)[6] .

Table 1: Production of rice and rice husks in 2004 (millions of tonnes)

	Rice	Rice husk
Brasil	12.8	2.82
Mata Grosso	2.07	0.46

The production of rice and consequently the supply of rice husks in Mata Grosso is very large, and consequently a large part of the rice husks are left to decay. The project activity aims to prevent part of this surplus not to be left for decay, avoiding the emission of methane.

[2] Secretaria de Estado e Planejamento de Renovação Geral do Mato Grosso, Balanço Energético do Estado do Mato Grosso, 2002

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

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

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

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

A.4.3.1 Estimated amount of emission reductions over the chosen crediting period:
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Table 2: Net emission reduction by the bundle of project emissions (tonnes CO2 equivalent per calendar year)

	Type I.D grid connected electricity generation			Type III.E Avoidance of methane production			Total net emission reduction
Year	Baseline emissions (A)	Project emissions (B)	Net emission reduction (A-B)	Baseline emissions (C)	Project emissions (D)	Net emission reduction (C-D)	(A-B) + (C-D)
1 Apr - 31 Dez 2008	**4,132**	**0**	**4,132**	**10,094**	**787**	**9,307**	**13,439**
2008	**6,686**	**0**	**6,686**	**16,333**	**1,273**	**15,060**	**21,745**
2009	**6,686**	**0**	**6,686**	**16,333**	**1,273**	**15,060**	**21,745**
2010	**6,686**	**0**	**6,686**	**16,333**	**1,273**	**15,060**	**21,745**
2011	**6,686**	**0**	**6,686**	**16,333**	**1,273**	**15,060**	**21,745**
2012	**6,686**	**0**	**6,686**	**16,333**	**1,273**	**15,060**	**21,745**
2013	**6,686**	**0**	**6,686**	**16,333**	**1,273**	**15,060**	**21,745**
1 Jan - 31 Mar 2015	**1,671**	**0**	**1,671**	**4,083**	**318**	**3,765**	**5,436**
Total estimated reductions	**45,918**	**0**	**45,918**	**112,175**	**8,746**	**103,429**	**149,347**
Total number of crediting years	**7**	**7**	**7**	**7**	**7**	**7**	**7**
Annual average over the first crediting period of estimated reductions (tonnes of CO_2 e)	**6,560**	**0**	**6,560**	**16,025**	**1,249**	**14,776**	**21,335**

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

Type III; Category III.E.: Avoidance of methane production from biomass decay through controlled combustion.

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 (11.9 MWth) and power (3.0 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.

Type III; Category III.E.: Avoidance of methane production from biomass decay through controlled combustion.

The applicability criteria of the Category III.E. 'Avoidance of methane production from biomass decay through controlled combustion' are:
Technology/measure
1. This project category comprises measures that avoid the production of methane from biomass or other organic matter that would have otherwise been left to decay as a result of anthropogenic activity. Due to the project activity, decay is prevented through controlled combustion and less methane is produced and emitted to the atmosphere. The project activity does not recover or combust methane (unlike III D). Measures shall both reduce anthropogenic emissions by sources, and directly emit less than 15 kilotonnes of carbon dioxide equivalent annually.

Decay is prevented through controlled combustion of rice husks and less methane is produced and emitted to the atmosphere. The direct carbon emissions are related to the emission of methane and nitrous oxide by combustion of the rice husks, which is maximally 1,273 tonnes of carbon dioxide equivalent annually. Therefore, project emissions leads to direct carbon emissions of less than 15 kilo tonnes of carbon dioxide equivalent annually.

It is concluded that project category III.E 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".

To estimate the baseline emissions related to the avoidance of methane production from biomass decay through controlled combustion, the baseline calculations as described under category III.E. of Appendix B are used. This methodology allows to calculate the Degradable organic carbon (DOC), by taking either the default value (0.3) , or by making use of the equation DOC = 0.4 (A) + 0.17 (B) + 0.15 (C) + 0.30 (D) where, A: per cent waste that is paper and textiles, B: per cent waste that is garden waste, park waste or non-food organic putrescibles, C: per cent waste that is food waste; D: per cent waste that is wood or straw. Because rice husks are a homogeneous feedstock, not consisting of the factors A, B, C, or D, it is decided to use the default value of DOC of 0.3.

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:

Scenario 1 - Continuation of current activities
This scenario represents continuation of the current practices. Rice husks are left for decay, producing methane, and because no electricity is produced with rice husks, all needed -fossil fuel based- electricity is delivered by the grid.

Scenario 2 - The construction of a renewable energy plant
In this scenario, the Urbano Sinop 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. Methane emissions from the decay of biomass residues will be interrupted.

With respect to the **investment** barrier:

- The continuation of current practices (Scenario 1) does not pose any investment barrier to the project developer, and requires no further financing.
- The construction of a renewable energy plant (Scenario 2) faces specific investment barriers due to the fact that the capital costs related to biomass CHP 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 subsidies or promotional support for the implementation of independent renewable energy plants. Besides, almost all energy will be reserved to internal consumption of the rice processing plant, a small part will be delivered to MAE (Wholesale Energy Market). The financial barrier is demonstrated through a financial analysis, which the results are presented in Table 3 below. Values used in the financial analysis are presented in the Annex 4. The carbon revenues increase the returns of the project transforming this into an attractive investment for the company and to the financial agents.

Table 3: Financial Analysis Results

	With Carbon	Without Carbon
Net Present Value ($)	2,955,589.32	1,263,535
IRR	18.68%	13,30%
Discount Rate	16,25%	
Present Value of carbon sold (7 years) $	2,313,997	

With respect to the **technological** barrier:

- In the case of Scenario 1, there are no technical/technological issues as this simply represents a continuation of current practices and did not involve any new technology or innovation. Indeed, in this scenario there were 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, and have been used effectively in the Host Country.

With respect to the analysis of **prevailing 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, 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). The south Brazilian region, i.e the states of 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 80% of the rice is transformed in products. The other 20-22% are rice residues.
- 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 utilised to sell beneficed rice for a lower price or to increment the profit margin of the product. The steam generated by the boiler will be used to achieve a higher quality in the rice process. Currently Urbano 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 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 an investment barrier.

Table 4: 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 have prevented that the project would have occurred anyway, it is concluded that the project is additional.

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

- The Baseline Scenario corresponds to a boiler that provides steam for the drying rice process and heat for parboiled rice production. This boiler consumes 7,200 tonnes of rice husks per year, or 52.25% of the total production. The surplus of biomass is left to decay in landfills, generating a considerable amount of methane. 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 3 MW. This implementation will imply in replacement of the old boiler by a new one and the co-generation process based on a condensing turbine with extraction. The company will increase the rice production, along two years in 70%. The amount of rice husks consumed will be 23,426 tonnes per year, avoiding methane generation caused by biomass decay. The energy imported from the grid, which contains a parcel coming from a carbon source, 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 emission.

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.

According to category III.E. the project boundary is the physical geographical site where the treatment of biomass takes place.

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. Therefore the project boundary of both project activities is the physical, geographical site of the rice mill as indicated in paragraph A 4.1.

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.

The baseline for avoidance of methane production from biomass decay through controlled combustion is based on methodology AMS III.E. of annex B of the simplified modalities and procedures for small-scale CDM project activities (Version 07: 28 November 2005). The baseline scenario is the situation where, in the absence of the project activity, biomass and other organic matter is left to decay within the project boundary and methane is emitted to the atmosphere. The baseline emissions are the amount of methane from the decay of the biomass or organic waste treated in the project activity.

Date of completion
20/01/2006

Name of person/entity determining the baseline:

- Ricardo Pretz and Ronaldo Hoffmann from PTZ Bioenegy Ltda and;
- Martijn Vis 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:

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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:

>>

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:

>>

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

>>

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)

Monitoring methodology of category III.E. 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:

>>

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.

The monitoring methodology belonging to category III.E. describes that:

- The amount of biomass and / or other organic matter combusted ($Q_{biomass}$) by the project activity in a year shall be monitored.
- Emissions of CH_4 and N_2O will be determined using the most recent IPPC default values
- The total annual project related emissions will be monitored and should be less than or equal to 15 kt of CO_2 equivalent.

In the project activity, rice husks are collected from at the plant location and combusted in the rice husk combustion and electricity generation installation. The biomass (rice husks) are produced at the rice processing plant, and will be either combusted in the biomass electricity plant or transported outside the plant to be left for decay. The amount of biomass combusted is monitored by calculation of the rice husk production and monitoring the rice husks leaving the factory.

The project related emissions are negligible, except for the emissions of methane and nitrous oxide, due to biomass combustion. The monitoring methodology of category III.E. allows monitoring of the emission of methane and nitrous oxide, due to biomass combustion, by determination of:

$$PE_y = Q_{biomass} * E_{biomass} (CH_4bio\_comb * CH_4\_GWP + N_2Obio\_comb * N_2O\_GWP)/10^6$$

where,

PE_y Project activity emissions (kilotonnes of CO_2 equivalent)

$Q_{biomass}$ Quantity of biomass treated under the project activity (tonnes)

$E_{biomass}$	Energy content of biomass (TJ/tonne)
CH_4bio_comb	CH_4 emission factor for biomass and waste (which includes dung and agricultural, municipal and industrial wastes) combustion (kg of CH_4/TJ, default value is 300)
CH_4_GWP	GWP for CH_4 (tonnes of CO_2 equivalent/tonne of CH_4)
N_2Obio_comb	N_2O emission factor for biomass and waste (which includes dung and agricultural, municipal and industrial wastes) combustion (kg/TJ, default value is 4)
N_2O_GWP	GWP for N_2O (tonnes of CO_2 equivalent/tonne of NO_2)

As indicated before, $Q_{biomass}$ can be measured accurately; because rice husks are a homogeneous biomass feedstock $E_{biomass}$ can be determined accurately. The other factors will be determined using the most recent IPPC default values. The project emissions will be monitored and it is proved that they value less than or equal to 15 kt of CO_2 equivalent.

It is justified to apply monitoring methodology belonging to category III .E as described in 'Appendix B of the simplified modalities and procedures for small-scale CDM project activities' (version 07: 28 November 2005).

D.3 Data to be monitored:

>>

Table 5: 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.

Table 6: D 3.2 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 III.E. ' Avoidance of methane production from biomass decay through controlled combustion':								
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.3.5	Amount of rice husks generated	Rice production	tonne / month	m	Monthly	100%	Electronic and paper	The monthly rice production times the rice to husk factor (22%) indicates the amount of rice husks generated.
D. 3.6	Amount or rice husks removed by truck	Documentation on transportation transactions	tonne/ month	m	Monthly	100%	Electronic and paper	
D. 3.7	Amount of biomass consumed by the project	D 3.5 D 3.6	tonne / month	c	Monthly	100%	Electronic and paper	Value calculated as generated rice husks (D 3.5) minus removed rice husks (D. 3.6)

D 3.8	Amount of biomass that would have been consumed in baseline scenario	Rice production and documentation on transportation transactions	tonne/ month	m	Monthly	100%	Electronic and paper	Value calculated conform D 3.5 and D 3.6. over last three years before project implementation. The average over these three years is taken as the yearly baseline amount of rice husks
D 3.9	Net amount of biomass prevented from being left to decay	D. 3.7 D. 3.8	tonne/ month	c	Monthly	100%	Electronic and paper	D.3.7 - D.3 8. This value equals $Q_{biomass}$ in the formulae in section E
D 3.10	MC: Moisture content of the biomass	Determination of moisture content	wt % (wet basis)	m	Yearly	Sample	Paper	The moisture content of the rice - and consequently in the husks - are monitored daily by a local lab. Because moisture content of rice husks is nearly constant, the analysis of the moisture content is performed once a year, on basis of daily measurements.
D 3.11	Edry: Energy content of the biomass (dry basis)	Literature	GJ/tonne dry	M	Once	Sample	Paper	The energy content of rice husks on dry basis, does practically not vary. Therefore a literature value is used.
D 3.12	$E_{biomass}$: Energy content of the biomass (as received)	D. 3.10 and D 3.11	GJ/tonne	C	Yearly	n.a.	Paper	The energy content is determined by the following equation: $E_{biomass}$ = Edry* (1-MC)
D.3.13	CH_4bio_comb	Most recent IPPC 1996 default value		E	Once	n.a.	Paper	
D. 3.14	CH_4_GWP	Most recent IPPC 1996 default value		E	Once	n.a	Paper	
D. 3.15	N_2Obio_comb	Most recent IPPC 1996 default value		E	Once	n.a	Paper	
D 3.16	N_2O_GWP	Most recent IPPC 1996 default value		E	Once	n.a	Paper	

D. 3.17	PEy	D. 3.9 D. 3.12 D. 3.13 D. 3.14 D. 3.15 D. 3.16	ktonnes of CO_2 equi-valent	C	Monthly	n.a.	Electronic and paper	Using the formula are indicated in the monitoring methodology of category III.E. of the simplified modalities and procedures for small-scale CDM project activities.

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

>>

Table 7: 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.

Table 8: D. 4.2 Quality control (QC) and quality assurance (QA) procedures are being undertaken for data monitored, related to category III.E.		
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.3.5	Low	Rice is the main product of the factory and its production volumes known in detail. Production of rice husks is directly related to the production of rice and can be derived from rice production numbers.
D. 3.6	Low	The amount of rice husks removed by truck is monitored accurately, as all truck loads are registered.
D. 3.7	Low	All produced rice husks that do not leave the factory site, are combusted in the CHP plant. This data can be double-checked by comparison with the net electricity production of the rice husk plant, taking average numbers of the electric efficiency and the energy density of the rice husks.
D. 3.8	Low	See D.3.5 and D.3.6
D.3.9	Low	It is a calculated value based on D 3.7-D 3.8, so no additional QC and QA procedures will be applied.
D. 3.10	Low	The moisture content of the rice, and consequently of the husks is monitored on a daily base. The moisture content of the husks is fairly constant, once the rice (and husks) are conditioned and stored at well known conditions, according to the health procedures for storage of grains. The daily data on the moisture content of rice and rice husks will therefore be analysed on a yearly base. In case of substantial changes in the process that could have an effect on the moisture content of the husks, additional analyses of moisture content will be performed. The moisture content is determined according to Brazilian Standard NBR 8289.
D. 3.11	Low	The HHV of rice husks hardly varies. No additional QC and QA procedures are necessary.
D. 3.12	Low	It is a calculated value based on D.3.10 and D.3.11, so no additional QC and QA procedures will be applied.
D. 3.13	Low	Most recent IPPC default values will be used as appropriate for small scale projects
D. 3.14	Low	Most recent IPPC default values will be used as appropriate for small scale projects
D. 3.15	Low	Most recent IPPC default values will be used as appropriate for small scale projects
D. 3.16	Low	Most recent IPPC default values will be used as appropriate for small scale projects
D. 3.17	Low	It is a calculated value based on D.3.9, D.3.12, D.3.13, D.3.14, D.15 and D.3.16 so besides QC and QA of these separate values (as described elsewhere in this table), no additional QC and QA procedures need to be applied.

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:

>>

URBANO Agroindustrial Ltda, PTZ Bioenergy Ltda (fully and exclusively authorized to act on the behalf of URBANO regarding this CDM project) and BioHeat International (exclusively authorized to sell the carbon credits from the URBANO project) are all project participants.

URBANO 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 URBANO.

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:

>>

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

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

SECTION E.: Estimation of GHG emissions by sources:

E.1. Formulae used:

>>

E.1.1 Selected formulae as provided in appendix B:

>>

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.

Category III.E.

Baseline emissions

CH_4_IPCCdecay = (MCF * DOC * DOC_F * F * 16/12)

where,

CH_4_IPCC$_{decay}$	IPCC CH_4 emission factor for decaying biomass in the region of the project activity tonnes of CH_4/tonne of biomass or organic waste)
MCF	methane correction factor (fraction) (default is 0.4)
DOC	degradable organic carbon (fraction) (default is 0.3)
DOC_F	fraction DOC dissimilated to landfill gas (default is 0.77)
F	fraction of CH_4 in landfill gas (default is 0.5)

$BE_y = Q_{biomass}$ * CH_4_IPCC$_{decay}$ * GWP_CH_4

where,

BE_y = Baseline methane emissions from biomass decay (tonnes of CO_2 equivalent)

$Q_{biomass}$ = Quantity of biomass treated under the project activity (tonnes)

CH_4_GWP = GWP for CH_4 (tonnes of CO_2 equivalent/tonne of CH_4)

Project emissions
According to the same guidelines for type IIE., the project emissions are calculated using the following formula:

$PE_y = Q_{biomass} * E_{biomass} (CH_4bio\_comb * CH_4\_GWP + N_2Obio\_comb * N_2O\_GWP)/10\text{^}6$

where,

PE_y	Project activity emissions (kilotonnes of CO_2 equivalent)
$Q_{biomass}$	Quantity of biomass treated under the project activity (tonnes)
$E_{biomass}$	Energy content of biomass (TJ/tonne)
CH_4bio_comb	CH_4 emission factor for biomass and waste (which includes dung and agricultural, municipal and industrial wastes) combustion (kg of CH_4/TJ, default value is 300)
CH_4_GWP	GWP for CH_4 (tonnes of CO_2 equivalent/tonne of CH_4)
N_2Obio_comb	N_2O emission factor for biomass and waste (which includes dung and agricultural, municipal and industrial wastes) combustion (kg/TJ, default value is 4)
N_2O_GWP	GWP for N_2O (tonnes of CO_2 equivalent/tonne of NO_2)

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.

Formulae to supplement equations presented in category III.E of annex B.
The energy content of the used rice husks -needed to estimate the project emissions- is determined in the following way:

$E_{biomass}$ = Edry * (1-MC)*10^-3

where,
$E_{biomass}$ = Energy content of biomass in TJ/tonne
E_{dry} = Energy content of dry biomass (HHV dry) in GJ/tonne
MC = moisture content of rice husks weight % wet basis.

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.

Except methane and nitrous oxide emissions because of combustion of biomass (to be determined under category III.E. project activity), the project emissions are negligible.

Category III.E.

PE_y = $Q_{biomass}$ * $E_{biomass}$ (CH_4bio_comb * CH_4_GWP + N_2Obio_comb * N_2O _GWP)/10^3

where,

PE_y	Project activity emissions (ktonnes of CO_2 equivalent)
$Q_{biomass}$	Quantity of biomass treated under the project activity (tonnes)
$E_{biomass}$	Energy content of biomass (TJ/tonne)
CH_4bio_comb	CH_4 emission factor for biomass and waste (which includes dung and agricultural, municipal and industrial wastes) combustion (kg of CH_4/TJ, default value is 300)
CH_4_GWP	GWP for CH_4 (tonnes of CO_2 equivalent/tonne of CH_4)
N_2Obio_comb	N_2O emission factor for biomass and waste (which includes dung and agricultural, municipal and industrial wastes) combustion (kg/TJ, default value is 4)
N_2O_GWP	GWP for N_2O (tonnes of CO_2 equivalent/tonne of NO_2)

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.

Category III.E.

No leakage calculation is required.

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.

Category III.E.

The total small scale project activity emissions consists of PE_y: the methane emissions and nitrous oxide emissions due to the combustion of rice husks, and is calculated as described in E. 1.2.1.

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 = EC * E prod / 10^6

where,

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

EC = Emission Coefficient (measured in kg CO_2equ/kWh)

E prod = Electricity production by project activity (kWh).

Category III.E.

Baseline emissions

CH_4_IPCCdecay = (MCF * DOC * DOC_F * F * 16/12)

where,

CH_4_IPCC$_{decay}$	IPCC CH_4 emission factor for decaying biomass in the region of the project activity (tonnes of CH_4/tonne of biomass or organic waste)
MCF	methane correction factor (fraction) (default is 0.4)
DOC	degradable organic carbon (fraction, see equation below or default is 0.3)
DOC_F	fraction DOC dissimilated to landfill gas (default is 0.77)
F	fraction of CH_4 in landfill gas (default is 0.5)

$BE_y = Q_{biomass}$ * CH_4_IPCC$_{decay}$ * GWP_CH_4

where,

BE_y	Baseline methane emissions from biomass decay (tonnes of CO_2 equivalent)
$Q_{biomass}$	Quantity of biomass treated under the project activity (tonnes)
CH_4_GWP	GWP for CH_4 (tonnes of CO_2 equivalent/tonne of CH_4)

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})

Category III.E.

Emission reduction by avoidance of methane production from biomass decay through controlled combustion equals:

$ER_{IIIE} = BE_y - (PE_y / 10^3)$

where,

ER_{IIIE}	Emission reduction by the avoidance of methane production from biomass decay through controlled combustion (tonnes of CO2 equivalent)
PE_y	Project activity emissions (kilotonnes of CO_2 equivalent)
BE_y	Baseline methane emissions from biomass decay (tonnes of CO_2 equivalent)

Total

The total combined emission reduction of the bundle of project activities of type I.D. and III.E are:

$ER_{total} = ER_{ID} + ER_{IIIE}$

ER_{total}	Total net emission reduction by the bundle of project activities (tonnes CO2 equivalent)
ER_{ID}	Emission reduction due to grid connected renewable electricity production (tonnes CO_{2equ})
ER_{IIIE}	Emission reduction by the avoidance of methane production from biomass decay through controlled combustion (tonnes of CO2 equivalent)

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 9: 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	14,440	MWh
Baseline emissions	BE_{el}	6,686	tonnes CO_2/year
Project emissions	n.a.	0	tonnes CO_2/year
Emission reduction from electricity generation	ER_{ID}	6,686	tonnes CO_2/year

Table 10: Emission reduction by avoidance of methane production from biomass decay through controlled combustion

Indicator	Abbreviation	Value	Unit
methane correction factor	MCF	0.4	dimensionless fraction
degradable organic carbon	DOC	0.3	dimensionless fraction
fraction DOC dissimilated to landfill gas	DOC_F	0.77	dimensionless fraction
fraction of CH_4 in landfill gas	F	0.5	dimensionless fraction
IPCC CH_4 emission factor for decaying biomass in the region of the project activity	CH_4_IPCCdecay	0.0616	tonnes of CH_4/tonne of biomass or organic waste
Quantity of biomass treated under the project activity	$Q_{biomass}$	12,388	tonnes/year
GWP for CH_4	CH_4_GWP	21	tonnes of CO_2 equivalent/tonne of CH_4
Baseline methane emissions from biomass decay	BE_y	16,025	tonnes of CO_2 equivalent/year
Energy content of dry biomass (HHV dry)	E_{dry}	15.49[a)]	GJ/tonne
Moisture content of the biomass	MC	12%	weight % wet basis
Energy content of biomass	$E_{biomass}$	0.013376	TJ/tonne
CH_4 emission factor for biomass and waste	CH_4bio_comb	300	kg of CH_4/TJ
N_2O emission factor for biomass and waste	N_2Obio_comb	4	kg/TJ
GWP for N_2O	N_2O_GWP	310	tonnes of CO_2 equivalent/tonne of NO_2
Project activity emissions	PE_y	1,249	ktonnes of CO_2 equivalent/year
Emission reduction by avoidance of methane production from biomass decay	ER_{IIIE}	14,776	tonnes of CO_2 equivalent/year

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

Table 11: Net emission reduction by the bundle of projects (tonnes CO_2 equivalent per calendar year)

	Type I.D grid connected electricity generation			**Type III.E Avoidance of methane production**			**Total net emission reduction**
Year	Baseline emissions (A)	Project emissions (B)	Net emission reduction (A-B)	Baseline emissions (C)	Project emissions (D)	Net emission reduction (C-D)	(A-B) + (C-D)
1 Apr - 31 Dez 2008	**4,132**	**0**	**4,132**	**10,094**	**787**	**9,307**	**13,439**
2008	**6,686**	**0**	**6,686**	**16,333**	**1,273**	**15,060**	**21,745**
2009	**6,686**	**0**	**6,686**	**16,333**	**1,273**	**15,060**	**21,745**
2010	**6,686**	**0**	**6,686**	**16,333**	**1,273**	**15,060**	**21,745**
2011	**6,686**	**0**	**6,686**	**16,333**	**1,273**	**15,060**	**21,745**
2012	**6,686**	**0**	**6,686**	**16,333**	**1,273**	**15,060**	**21,745**
2013	**6,686**	**0**	**6,686**	**16,333**	**1,273**	**15,060**	**21,745**
1 Jan - 31 Mar 2015	**1,671**	**0**	**1,671**	**4,083**	**318**	**3,765**	**5,436**
Total estimated reductions	**45,918**	**0**	**45,918**	**112,175**	**8,746**	**103,429**	**149,347**
Total number of crediting years	**7**	**7**	**7**	**7**	**7**	**7**	**7**
Annual average over the first crediting period of estimated reductions (tonnes of CO_2 e)	**6,560**	**0**	**6,560**	**16,025**	**1,249**	**14,776**	**21,335**

SECTION F.: Environmental impacts:

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

>>

Documentation
The environmental permit for operation from the Environmental Agency of Mato Grosso State (SEMA – Secretaria de Estado de Meio Ambiente) was issued to the URBANO rice mil is accomplished to local environmental licence demand.

Renewable electricity production
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 Sinop;
- Chamber of Sinop;
- 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 participants

Organization:	Urbano Agroindustrial Ltda.
Street/P.O.Box:	BR 163, Km 846
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Represented by:	
Title:	Mr.
Salutation:	
Last Name:	Franzner
Middle Name:	
First Name:	Guido
Department:	
Mobile:	
Direct FAX:	
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Personal E-Mail:	sinop@urbano.com.br

Organization:	PTZ BioEnergy Ltd.
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Direct FAX:	
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Project developer and fully authorized representative of the project participant URBANO Agroindustrial Ltda. regarding this CDM-project activity

Organization:	PTZ BioEnergy Ltd.
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Project advisor / developer

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Represented by:	
Title:	Director
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Mobile:	
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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 was used the Executive Board recommended values just for the Build Margin calculation and for the Operating Margin the values adopted was the average 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 URBANO Sinop Biomass Electricity Generation Project

Year	Electricity generated/year (MWh)	Amount of rice husks produced (kg/year)	Amount of rice husks consumed by the project (kg/year)	Amount of rice husks consumed anyway (kg/year)	Amount of rice husks to the landfill (kg/year)	% Consumed
2007	-	13,780,000	-	7,200,000	6,580,000	52,2%
2008	8,924	18,603,000	7,803,000	10,800,000	0	100%
2009	14,440	23,426,000	12,626,000	10,800,000	0	100%
2010	14,440	23,426,000	12,626,000	10,800,000	0	100%
2011	14,440	23,426,000	12,626,000	10,800,000	0	100%
2012	14,440	23,426,000	12,626,000	10,800,000	0	100%
2013	14,440	23,426,000	12,626,000	10,800,000	0	100%
2014	14,440	23,426,000	12,626,000	10,800,000	0	100%
2015	14,440	23,426,000	12,626,000	10,800,000	0	100%