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:

Uruba Renewable Irrigation Project
Version 01
23 August 2006.

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

Uruba Renewable Irrigation Project (hereafter, the Project) was developed by Grupo João Lyra (Laginha Agro Industrial S.A.), the proponent and operator of the project activity. The Project activity consists of replacing diesel fuel irrigation devices with electric irrigation devices in sugarcane fields. The project activity involves the acquisition of new electric irrigation devices, and the construction and installation of a new grid alongside the sugar cane fields. The electricity used to feed those equipments will be co-generated with sugar cane bagasse (renewable energy). The project will be developed in Uruba unit, located in Atalaia municipality, Alagoas.

The Project Activity takes place in a dry region and the majority of the irrigation process involves the use of diesel fuel irrigation devices; currently, only a small portion of the process involves the utilization of electric irrigation devices.

The Project activity is helping Brazil fulfill its goals of promoting sustainable development. Specifically, the Project is in line with host-country specific CDM requirements because it:

- Contributes to local environmental sustainability since it will decrease use of fossil energy based on diesel sources, and replace it with alternative renewable energy;
- It uses clean and efficient technologies;
- Increases employment opportunities in the Project location – the new plant will require a whole team for operation, management and repair services;
- Contributes to technology and capacity development – all technology, labour and technical maintenance will be provided inside Brazil.
- Acts as a clean technology demonstration project, encouraging the development of modern and more efficient renewable energy units throughout Brazil.
- Provides an appropriate destination for solid residues (bagasse) generated in sugar and alcohol production process.

A.3. Project participants:

Table A.3 1: João Lyra Project Participants.

Name of Party involved	Private and/or public entity (ies) project participants	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Brazil (Host Country)	Private Entity Laginha Agro Industrial S.A.	No
United Kingdom of Northern Ireland and Great Britain	Private Entity EcoSecurities Ltd.	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:

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

A.4.1.1. Host Party(ies):

Brazil

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

Alagoas (AL)

A.4.1.3. City/Town/Community etc:

- Uruba, located in Atalaia municipality, AL;

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

- Uruba – 09° 28’ 45”S 41° 57’ 43”W

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

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According to Appendix B of Simplified modalities and procedures for small scale CDM projects, the project activity is Type I – Renewable Energy Project, Category I.B– Mechanical energy for the user, version 08, 03 March 2006.

The sectoral scope is: Energy industry- renewable/non-renewable sources.

The Project will generate electricity from a Combined Heat and Power system (CHP), or cogeneration system. This system provides a greater amount of energy per unit of biomass consumed than a system that does not employ CHP. The technology is known as steam-Rankine cycle and consists of boiling

pressurised water; the resulting steam expands to drive a turbo-generator and is then condensed back to water for partial or full recycling in the boiler. A heat exchanger is used in some cases to recover heat from flue gases to preheat combustion air and a de-aerator must be used to remove dissolved oxygen from water before it enters into the boiler. The manufacturer, model, installed capacity and other characteristics of the equipment are detailed in the tables below.

The electricity generated will be used to power electric irrigation devices. The irrigation devices are similar to small tractors and move across the sugar cane fields in specific tracks and the water is pumped through the devices to irrigate the fields. For the Project activity, an electric grid will be constructed along the fields into which the electric irrigation devices will be connected.

Figure 1 - Diesel irrigation devices, similar to the new electric irrigation devices

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:

The Project uses renewable energy for irrigation co-generated in the plant facility with the bagasse, this source of energy is considered CO_2 neutral leading the project activity to zero emissions. If the project activity was not implemented the irrigation would be made by diesel irrigation devices, a more intensive source of carbon.

The estimate emissions reductions are detailed in section E.

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

Table A.4 1: Annual estimation of emission reductions over the chosen crediting period

Years	Annual estimation of emission reductions over the chosen crediting period
2001	744
2002	4,092
2003	4,092
2004	4,092
2005	5,208
2006	5,208
2007	5,208
Total estimated reductions (tonnes of CO_2)	28,644
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO_2)	4,092

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

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

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

Laginha Agro Industrial S.A. is developing one more CDM project, named "Guaxuma Renewable Energy Project". According to Appendix C of the Simplified Modalities and Procedures for Small-Scale CDM project activities, the proposed project activity is not a fragmentation of a larger project if the analysis presented in the Table below results in at least one negative result. The proposed project activity will be considered a debundled component of a larger if the project participants, project category, registration date and project boundary are the same for all projects. The following analysis of debundling, for the proposed project activity and the project developed by Laginha Agro Industrial S.A., concluded that proposed project activity in not a debundled component of a larger project. See table A.4 2.

Table A.4 2 - Debundling Occurrence Analysis

Item \ Project	Uruba Renewable Irrigation Project	Guaxuma Renewable Irrigation Project	Occurrence of Debundling
Project Participants	Laginha Agro Industrial S.A.	Laginha Agro Industrial S.A.	Yes
Project category	I.B– Mechanical energy for the user	I.B– Mechanical energy for the user	Yes
Registration	To be registered	To be registered	Possible
Boundary	Coruripe	Atalaia	No

The project will be a debundling of a larger project if the four items above occur simultaneously. In addition to the boundary analysis, Uruba Renewable Irrigation Project boundary is more than 1 km far from Guaxuma Renewable Irrigation Project boundary. The distance between Coruripe and Atalaia is approximately 70 km. In conclusion the project is not a debundled project.

SECTION B. Application of a baseline methodology:

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

- Project Activity I.B. – Mechanical energy for the user.

From Appendix B of simplified modalities and procedures for small-scale CDM project activities, version 08, 03 March 2006.

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

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

The project activity is applicable to small scale project type 1 (Renewable Energy):

Methodology 1.B – Mechanical energy for the user - It fits into the applicability requirements demanded by this category. This category comprises renewable energy generation units that supply users with a small amount of mechanical energy for irrigation.

According to the methodology: "In the case of irrigation where diesel fuelled pumps are used directly, the cumulative rating of diesel-fuelled pumps shall not exceed 15 MW".

Table B.2 1 below shows that the diesel component of Uruba's irrigation system does not exceed 15MW.

Table B.2 1 – Cumulative Rating of Diesel Irrigation Devices

Unit	Type	Quantity	Installed capacity CV	Installed capacity MW
Uruba	Diesel	35	5,091 CV	3.8 MW

The methodology also states: "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". That is clearly shown in Table B.2 2 below, which is the sum of all electric irrigation devices is 1,0444 thus smaller than 15MW.

Table B.2 2 – Cumulative Rating of New Electrical Irrigation Devices

Unit	Serial number	Type	Brand	Model	Pump	Purchase year	Installed capacity per device CV	Total Installed capacity MW[1]
Uruba	0309001	Electricity	WEG	IV POLOS	EQUIPE	**2001**	100 CV	0,0746 MW
Uruba	0309002	Electricity	WEG	IV POLOS	EQUIPE	**2001**	100 CV	0,0746 MW
Uruba	0309003	Electricity	WEG	IV POLOS	EQUIPE	**2002**	100 CV	0,0746 MW
Uruba	0309004	Electricity	WEG	IV POLOS	EQUIPE	**2002**	100 CV	0,0746 MW
Uruba	0309005	Electricity	WEG	IV POLOS	EQUIPE	**2002**	100 CV	0,0746 MW
Uruba	0309006	Electricity	WEG	IV POLOS	EQUIPE	**2002**	100 CV	0,0746 MW
Uruba	0309007	Electricity	WEG	IV POLOS	EQUIPE	**2002**	100 CV	0,0746 MW
Uruba	0309009	Electricity	WEG	IV POLOS	EQUIPE	**2002**	100 CV	0,0746 MW
Uruba	0309010	Electricity	WEG	IV POLOS	EQUIPE	**2002**	100 CV	0,0746 MW
Uruba	0309011	Electricity	WEG	IV POLOS	EQUIPE	**2002**	100 CV	0,0746 MW
Uruba	0309014	Electricity	WEG	IV POLOS	EQUIPE	**2002**	100 CV	0,0746 MW
Uruba	0309008	Electricity	WEG	IV POLOS	EQUIPE	**2005**	100 CV	0,0746 MW
Uruba	0309012	Electricity	WEG	IV POLOS	EQUIPE	**2005**	100 CV	0,0746 MW
Uruba	0309013	Electricity	WEG	IV POLOS	EQUIPE	**2005**	100 CV	0,0746 MW
Total:								1,0444

The final applicability criteria for the methodology says:

"Project activities adding renewable energy capacity should consider the following cases:
1) Adding new units;
2) Replacing old units for more efficient units.

To qualify as a small scale CDM project activity, the aggregate installed capacity after adding the new units (case 1) or installed capacity of the more efficient units (case 2) should be lower than 15 MW".

The expansion of irrigation based on electric irrigation devices is resultant of the expansion of renewable generation capacity. The table B 2 3 below presents the generation installed capacity of Urubas's unit which remains below 15 MW even after expansion.

Table B.2 3: Generations installed capacity in Uruba**.**

Plant	Installed Capacity	Date	Comments
Uruba	5 MW	September 2000	Not undertaken as a CDM activity (generates energy only for the process)
	5 MW	December 2002	

The following table shows the key information and data used to determine the baseline scenario:

[1] Please refer to Table I.D.1 of AMS I.D. *'Grid connected renewable electricity generation'*

Table B.2 4: Key information and data to determine the baseline and project activity emissions.

Variable	Data Source
Diesel fuel irrigation device emission factor (in tCO_2/MWh)	IPCC (following table I.D.1 from Appendix B of simplified modalities SSC-CDM, version 09)
Electricity used by the project ($EG_{irrigation}$, in MWh)	Project Developer

In the Baseline section of the methodology, it is stated that: "In the case of project activities adding renewable energy capacity, if the availability of renewable resources is limited, the impact of a decrease in energy production from the units installed before the project implementation must be considered". Bagasse should not be considered as a limited resource as it is a by-product of own production and there is no other use for bagasse at the region.

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:

According to Attachment A to Appendix B of the simplified modalities and procedures for CDM small scale project activities, evidence as to why the proposed project is additional can be shown by conducting an analysis of the following: (a) investment barriers, (b) technological barriers, (c) prevailing practice and (d) other barriers. The result is a matrix that summarizes the analysis, providing an indication of the barriers faced by each scenario. The most plausible scenario will be the one with the fewest barriers.

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

- Scenario 1 - Non-expansion of irrigation– This scenario represents the use of a small amount of irrigation with diesel fuel irrigation devices (and in some cases a small portion of renewable energy).

- Scenario 2 - Expansion of irrigation based on diesel devices - This scenario represents the continuation of current practices, which means the increase of irrigation using new diesel fuel irrigation devices.
- Scenario 3 - Expansion of irrigation based on electric devices (not undertaken as a CDM project activity)– In this scenario, a grid will be constructed along the sugar cane fields, new electric irrigation devices will be purchased for expansion of irrigation and substitution of diesel devices. For this scenario, the alternative source of energy is sugar cane bagasse cogeneration plants (renewable energy source), including one new cogeneration plant built to provide electricity to irrigation.

The barriers are as follows:

- Financial/economical – This barrier evaluates the viability, attractiveness and financial and economic risks associated with each scenario, considering the overall economics of the project and/or economic conditions in the country.
- Technical/technological – This barrier evaluates whether the technology is currently available, if there are indigenous skills to operate it, if the application of the technology is of regional, national

or global standard, and generally if there are technological risks associated with the particular project outcome being evaluated.

- Prevailing business practice – This evaluates whether the project activity represents prevailing business practice in the industry. In other words, it assesses whether in the absence of regulations it is a standard practice in the industry, if there is experience to apply the technology and if there tends to be high-level management priority for such activities.
- Other barriers - This barrier evaluates whether without the project activity emissions would have been higher, for any other reason identified, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies.

General Context

Growth of sugar cane requires special conditions of soil characteristics and a certain amount of water. These two factors combined determine total production. The Project activity takes place in a region with good soil conditions but with dry climate. To overcome this problem, the use of irrigation has become very important; the results (in terms of sugar cane vertical growth) can be realized in the same season as the irrigation is implemented.

The sugarcane based agriculture business plays an important role in the Brazilian economic development and market competitiveness. Irrigation expansion will help put the producers at the same level as others sugarcane producers in less dry regions.

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

- (Scenario 1) It presents a financial/economical barrier to the project developer. It requires no further financing; however, the production is directly linked with the amount of irrigation. Not using an expanded irrigation system will put Grupo João Lyra at a competitive disadvantage in the market.

- (Scenario 2) this scenario shows the most likely situation to happen. It has been proven that sugar cane growth correlates directly with irrigation and results from improved irrigation are shown very quickly, in terms of production and consequently cashflow. It is cheaper and faster to achieve the increase in sugar cane production with diesel fuelled irrigation devices. In this case, the amount of investments involved are small, and do not require loans. It is positive, given the high capital costs in Brazil. With respect to the price of fossil fuel, using diesel was quite cheap during the years previous to decision making (prior to 2000), and there were no trends of increasing prices (see Figure 2). Diesel, therefore, represents that most likely fuel use in the baseline.

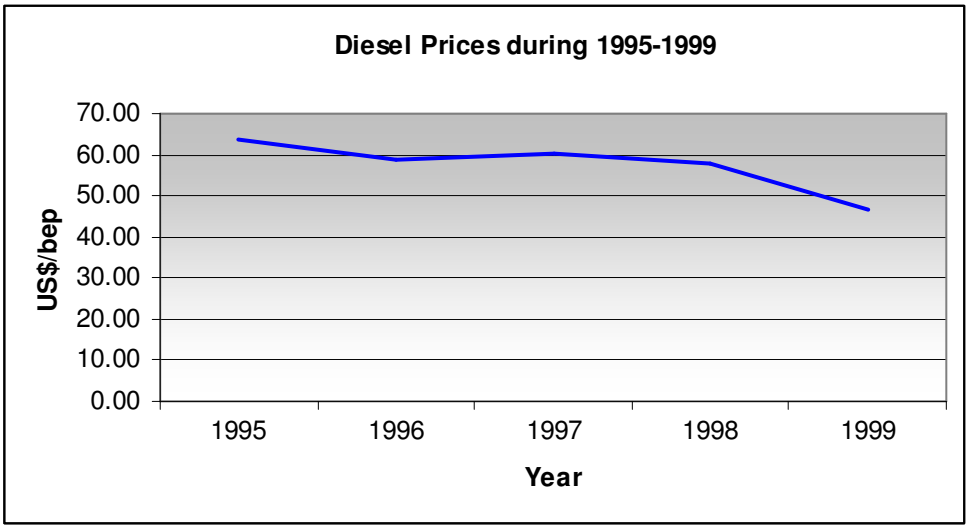

Figure 2 - Diesel price evolution since 1995 to 1999 (source: National Energy Balance 2003)

- (Scenario 3) This scenario faces specific financial/economic barriers. The electric irrigation requires the adaptation of the co-generation plant for a higher demand of energy; hiring engineers to run the plants; and the construction of a new electric grid along the sugar cane fields into which the irrigation devices will be connected. Electric irrigation requires higher levels of investment for implementation and requires more time to be set up, with investments presenting a return only in the long term. In addition, Brazil presents a high risk for long term investments, as the Brazilian Prime Interest Rate (known as SELIC), as well as the CDI (Certificado de Depósito Interbancário - interbank deposit certificate) -the measure of value in short-term credit- are very high, making long term investments, such as construction of cogeneneration plant and a grid along the sugar cane fields and cogeneration plants, not attractive for any sugar cane producer.

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

- In the case of Scenario 1,there are no technical/technological barriers as this simply represents a continuation of current practices for smaller producers which is little or no irrigation of the sugar cane fields.

- 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; they are part of the business as usual situation for all the sugar cane producers that want to increase its production in a cheaper and faster way. For diesel irrigation, the only technological requirement is the irrigation device, once it is bought, it is ready to use. The project developer is already very familiar with this type of technology.

- In the case of Scenario 3, there are significant technical/technological barriers. The electric irrigation devices will require the installation and maintenance of a complex electric grid in the sugar cane fields; this is much more difficult and costly in comparison to using diesel irrigation devices. The maintenance of an internal grid will also require specialized labour and represents a risk for optimum

operation of irrigation devices. Even in the Project activity, there is the necessity of the continuation of some diesel irrigation devices due to technical and risk constraints.

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

- In the case of Scenario 1, João Lyra's Group is one of the three biggest producers in the region so the prevailing practice of no irrigation will place the group back in the same position as the smaller producers; presenting a significant barrier to the implementation of this scenario.

- In the case of Scenario 2, there are no barriers to this option. To maintain market position the Project Developer must increase irrigation; and the use of diesel irrigation devices is the fastest and easiest way of doing that. All the producers in the region use diesel fueled devices, given that the devices can be easily moved and used in all parts of the field, rather than having to be connected to a mini-grid.

- In case of Scenario 3, Build a grid along the sugar cane fields and use electric irrigation devices are a barrier since it brakes the common practice and has a long set up time.

Table B.3 1 below summarizes the results of the analysis regarding the barriers faced by each of the plausible scenarios. As the table indicates, Scenario 2 faces no barriers, whereas Scenario 3 faces financial/economic barriers and is against prevailing practice.

Table B.3 1: Summary of Barriers Analysis.

Barrier Evaluated		Scenario 1	Scenario 2	Scenario 3
1.	Financial / Economical	**Yes**	No	**Yes**
2.	Technical / Technological	No	No	**Yes**
3.	Prevailing Business Practice	**Yes**	No	**Yes**
4.	Other Barriers	No	No	No

To conclude, the barrier analysis above has clearly shown that the most plausible scenario is scenario 2 (Expansions of irrigation based on diesel devices). Therefore, the project scenario is not the same as the baseline scenario; these are defined as follows:

- The **Baseline Scenario** is represented by Scenario 2, described as the irrigation of sugarcane fields using the same equipments from period previous to 2000, and expansions of irrigation based on diesel devices.

- The **Project Scenario**, represented by Scenario 3, is the construction of a grid along the sugar cane field, purchase of new electricity irrigation devices and the construction of a co-generation unit fueled with sugar cane bagasse.

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:

- Methodology 1.B: The project boundary encompasses the physical and geographical site of the renewable energy technology, and the equipment that uses the mechanical energy produced delineates the project boundary.
  The project boundary of the Project activity encompasses the geographical area of the sugarcane fields where the irrigation devices and the new grid are located and the facility where the energy is generated and sugar/ethanol is produced.

Conforming to the guidelines and rules for small-scale project activities, the emissions related to production, transport and distribution of the fuel used in the power plants in the baseline are not included in the project boundary, as these do not occur at the physical and geographical site of the project. For the same reason, the emissions related to the transport and distribution of electricity are also excluded from the project boundary.

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

Date of completion of baseline development is 24/08/2006.
EcoSecurities Ltd is the entity determining the monitoring plan and participating in the project as the Carbon Advisor. People in charge of its development are:

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

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

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

September 2000

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

21y - 00m

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

C.2.1. Renewable crediting period:

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

01/01/2001

C.2.1.2. Length of the first crediting period:

7y – 0m

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

Not applicable

C.2.2.2. Length:

Not Applicable.

SECTION D. Application of a monitoring methodology and plan:

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

- Project ActivityI.B – Mechanical energy for the user.

From Appendix B of simplified modalities and procedures for small-scale CDM project activities,version 08, 03 March 2006.

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

The project activity is applicable to small scale project type 1 (Renewable Energy):
Methodology I.B – Mechanical energy for the user. The applicability conditions are the same required in the baseline methodology. See section B.2 for a detailed explanation.

D.3 Data to be monitored:

Table D.3 1: Data to be collected in order to monitor emissions from the project activity and how this data will be archived.

ID number	Data type	Data variable	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For how long is archived data to be kept?	Comment
D.3.1	Irrigation devices	Number of irrigation devices operating	Number	M	Annually	100%	Electronic and paper	During the whole crediting period + 2 years	The number of irrigation devices operating will be monitored continuously and recorded annually.
D.3.2	Installed capacity	Installed capacity of each irrigation device	MW	M	Annually	100%	Electronic and paper	During the whole crediting period + 2 years	The installed capacity of each irrigation devices operating will be monitored continuously and recorded annually.
D.3.3	Hours of operation	Annual hours of operation	Hours	E	Annually	At least 50%	Electronic and paper	During the whole crediting period + 2 years	Operation hours of will be estimated using sampling methods and, if necessary, can be double checked by the electricity delivered to the irrigation grid.

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

Table D.4 1: Quality Control (QC) and quality assurance (QA) procedures being undertaken for data monitored

Data	Uncertainty level of data: (high, medium, low)	Are QA/QC procedures planned for these data?	Explain QA/QC procedures planed for these data, or why such procedures are not necessary
D.3.1	**Low**	**Yes**	Irrigation devices make part of the company patrimony. The number of devices is audited since the Brazilian government asks for a patrimony balance every year.
D.3.2	**Low**	**Yes**	Data based on equipment manual.
D.3.3	**Low**	**Yes**	Crosschecked with the amount of electricity delivered to the irrigation grid.

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:

The Grupo João Lyra has a specialized team responsible for irrigation. The variables D.3.1 and D.3.2 have been collected for a long time. All procedures are already defined and incorporated in the company's routine.

The plant operation and training procedures in place will ensure proper measurement and reporting. Moreover, this data will be object of internal audits, assuring the integrity of the data collected

Concerning leakage, no sources of emission were identified, given that the electricity generating equipment is not transferred from any other activity. Moreover, neither methodology requests leakage calculation.

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

Date of completion of monitoring plan development is 24/08/2006.

EcoSecurities Ltd is the entity determining the monitoring plan and participating in the project as the Carbon Advisor. People in charge of its development are:

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SECTION E.: Estimation of GHG emissions by sources:

E.1. Formulae used:

E.1.1 Selected formulae as provided in appendix B:

This is not applicable. No formula is provided.

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

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

No formula is needed. Emissions by sources are nil since renewable energy, such as sugar cane bagasse, is a CO_2-neutral source of energy.

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

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

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

Zero emissions (0 t CO_2e) for the electricity generation component.

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:

Methodology I.B

The methodology used for the calculation of baseline emissions from the use mechanical energy follows the paragraph 5, item (a) of simplified modalities and procedures for small-scale CDM projects activity, version 08, 03 March 2006.

The baseline emissions:

The baseline scenario is defined as the irrigation using diesel irrigation devices. The area irrigated would be the same as in project scenario. Thus, the baseline emissions from diesel irrigation devices that otherwise would occur in the absence of the project activity are calculated as follows:

Assumption:

I_BS = I_PS

Where:
I_BS is the energy used for irrigation in the baseline scenario
I_PS is the energy used for irrigation in the project scenario

Emission reduction calculation:

$ER_y = BE_y – PE_y – L_y$

Where:
ER_y: Emission reduction of CO_2e in the year *y* (tones of CO_2e)
BE_y: Baseline emission of CO_2e in the year *y* (tones of CO2e)
PE_y: Project emission of CO_2e in the year *y* (tones of CO2e)
L_y : Leakage emissions of CO_2e in the year *y* (tones of CO2e)

Given that the project emission and leakage are zero, the formula can be summarized as:

$ER_y = BE_y$

The baseline emissions are calculated as function of number of electric irrigation devices, installed capacity of each equipment and time spent in the field. The formula is:

$$ER_y = \sum IC_i * H_{i,y} * EF_i$$

Where:
ER_y: Emission reduction of CO_2e in the year *y* (tones of CO_2e)
IC_i: Installed capacity of irrigation device model *i* during year *y* (in MW)
$H_{i,y}$: Hour of operation of irrigation device model *i* during the year y.
EF_i: Emission Factor of irrigation device model *i* during the year *y* (ton of CO2e / MWh). This emission factor comes from table I.D.1 presented in methodology AMS I.D, version 9.

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

The emission reductions for the electricity component of the proposed project are calculated using the formula above. The expected annual emission is detailed in the table below.

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

Unit	Serial number	Installed capacity CV	Installed capacity MW	working hour/year	Emission Factors for diesel generator systems [2] (tCO_2e/KWh)	Emissions Arising From	Emission Reductions tCO_2e/y
Uruba	0309001	100 CV	0,0746 MW	4992	0,0010	2001	372
Uruba	0309002	100 CV	0,0746 MW	4992	0,0010	2001	372
Uruba	0309003	100 CV	0,0746 MW	4992	0,0010	2002	372
Uruba	0309004	100 CV	0,0746 MW	4992	0,0010	2002	372
Uruba	0309005	100 CV	0,0746 MW	4992	0,0010	2002	372
Uruba	0309006	100 CV	0,0746 MW	4992	0,0010	2002	372
Uruba	0309007	100 CV	0,0746 MW	4992	0,0010	2002	372
Uruba	0309009	100 CV	0,0746 MW	4992	0,0010	2002	372
Uruba	0309010	100 CV	0,0746 MW	4992	0,0010	2002	372
Uruba	0309011	100 CV	0,0746 MW	4992	0,0010	2002	372
Uruba	0309014	100 CV	0,0746 MW	4992	0,0010	2002	372
Uruba	0309008	100 CV	0,0746 MW	4992	0,0010	2005	372
Uruba	0309012	100 CV	0,0746 MW	4992	0,0010	2005	372
Uruba	0309013	100 CV	0,0746 MW	4992	0,0010	2005	372

Years	Cumulative Installed Capacity of New Additions (MW)	Estimation of baseline emission reductions (tones of CO2 e)
2001	0.15 MW	744
2002	0.82 MW	4,092
2003	0.82 MW	4,092
2004	0.82 MW	4,092
2005	1.04 MW	5,208
2006	1.04 MW	5,208
2007	1.04 MW	5,208
Total (tones of CO_2e)		28,644

[2] Refer to Table I.D.1, from AMS I.D. "Grid connected renewable electricity generation".

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 new cogeneration plant is smaller than 10 MW. Brazilian environmental law does not require Environmental Assessment studies for small cogeneration plants, considering that they do not have significant environmental impacts. The Environmental Agency responsible for monitoring the activities from project proponent didn't request an Environmental Assessment Study for the construction of a cogeneration plant with 5 MW of installed capacity, the internal grid for supplying electricity for irrigation neither for the purchase of new irrigation devices.

The plant received official permits from local official authorities to start activities (Operation License from IMA, nº 66/06). In addition to complying with legislation, project proponents developed an Environmental Control Plan, which evaluates the environmental aspects of the projects, trying to minimize the negative impacts.

Impacts mitigation

Activities such as irrigation is required more often during the dry season and the use of the marginal electricity generation is also required more in the same situation as hydro plants depends on the hydrological system. Therefore, the Project activity using the energy generated from bagasse cogeneration in the irrigation process is directly contributing to the decrease of the use of marginal energy supplied by the grid (which is highly greenhouse gas intensive).

SECTION G. Stakeholders' comments:

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

According to Resolution #1 dated December 2nd, 2003 from the Brazilian Inter-Ministerial Commission of Climate Change (Comissão Interministerial de Mudança Global do Clima - CIMGC), any CDM projects must send a letter with a 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: Atalaia.
- Chamber of Deputy of the municipality above;
- Environment agencies from the State and the municipality cited above;
- 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 community 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. EcoSecurities Ltd. 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

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

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

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