

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

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**Revision history of this document**

<b>Version Number</b>	<b>Date</b>	<b>Description and reason of revision</b>
01	21 January 2003	Initial adoption
02	8 July 2005	<ul style="list-style-type: none"><li>• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document.</li><li>• As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <a href="http://cdm.unfccc.int/Reference/Documents">http://cdm.unfccc.int/Reference/Documents</a>.</li></ul>
03	22 December 2006	<ul style="list-style-type: none"><li>• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.</li></ul>

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

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

Surac Bagasse Plant Project  
Version 1  
19 March 2008

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

The Bagasse Cogeneration Plant Project (the “Project”) developed by Surac S.A. (the “Project Developer” or Surac) is a biomass cogeneration steam project located in the Mechra bel Ksiri, Morocco (the Host Country) that will supply steam to the sugar refineries owned by Sunabel S.A.. The project will be constructed next to the plant where the steam will be sold to. The project will be supplying 100,000 tonnes of steam during the sugar production campaign that normally lasts from April to June or 100 days each year. It will then be generating approximately 42 tonnes per hour of steam at 28 bar and 375 degrees running continuously (24 hours, 7 days a week).

The project will supply high quality steam to Sunabel, reducing carbon dioxide emissions by offsetting fossil fuel-fired steam generation. In the absence of the project the steam would be produced at the sugar factory using coal.

The project Developer will be using their own production of bagasse, an organic material of plant origin that is suitable as fuel which would be otherwise burned in open fields, to generate the steam. Moreover, the Project Developer has also secured a contract for the sale of all the steam production with Sunabel.

The project will claim emission reductions through the displacement of more carbon intensive coal generated process steam. Currently, the refinery is using 17,000 tonnes of coal per year while processing sugar beet for non-refined sugar production. In the future though, the plant will be using 20,000 tonnes per annum instead due to a new refinery that will be installed in the plant in 2008. Independently of the installation of this new refinery, the project will be displacing approximately 11,000 tonnes of coal per year; the rest of coal will still be used by Sunabel to produce the electricity necessary for the plant.

By utilising biomass to displace fossil fuel in energy generation, the Project will contribute to the development of Morocco’s renewable energy sources. The controlled combustion of biomass in the plant’s boiler offers a more environmentally sound means of disposal of biomass waste residues. In addition, the use of domestically available biomass as an energy resource helps conserve foreign exchange by reducing the reliance on imported fossil fuels to meet the country’s expanding energy requirements.

Other expected benefits from the project include:

- The multiplier effect of this investment is likely to bring additional benefits such as increased employment opportunities in the area where the project is located. 18 new positions will be created for the operation of the plant (9 permanent and 9 temporary that will be working only when the sugar cane factory will be operating), furthermore there will be additional 50 extra people during the construction stage;

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- It increases the diversity and security of energy supply by the usage of a local by-product generated locally as opposed to diesel's price and availability that depends upon non-controllable externalities;
- It contributes towards a decrease in fossil fuel consumption;
- It avoids atmospheric pollution from the open burning of the bagasse piles.
- It offers a solution to the waste management problem caused by the excess of bagasse while avoiding a high risk of uncontrolled fires.
- It promotes the usage of CDM as a way to finance additional projects, especially in renewable energies. Since no CDM biomass project has been yet registered under the Clean Development Mechanism in Morocco, it will then be the first of its kind promoting thus this way of financing non-financially attractive projects.

**A.3. Project participants:**

Name of Party involved (*) (host) indicates a host Party)	Private and/or public entity(ies) Project participants (*) (as applicable)	Kindly indicate if the Party involved wished to be considers as project participant
Morocco (host)	Surac S.A.	No
United Kingdom of Great Britain and Northern Ireland	EcoSecurities Group plc	No

Contact details information on projects participants are provided in Annex 1.

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

Currently, three boilers are in place in order to supply the beet sugar factory with its steam needs. Each of them is producing 26 tonnes of steam per hour, having an efficiency of 8.2 tonnes of steam per tonne of coal combusted.

The Project will utilise a new biomass boiler that will be generating 42 tonnes/hour of steam at 28 bar to be supplied by Babcock Wanson Maroc<sup>1</sup>. Its steam output will be modified according to the demand but will always remain under the maximum continuous steam output. Therefore, the steam production will be monitored accordingly.

Its specifications are listed below:

General Specifications of the boiler (see Annex 8 for further technical information):

- Brand : Babcock Wanson Maroc
- Type: : BR2 33-53
- Working Pressure : 28 bar
- Steam Temperature : 375°C
- Feed Water Temperature : 100°C
- Bagasse boiler efficiency : min 80%

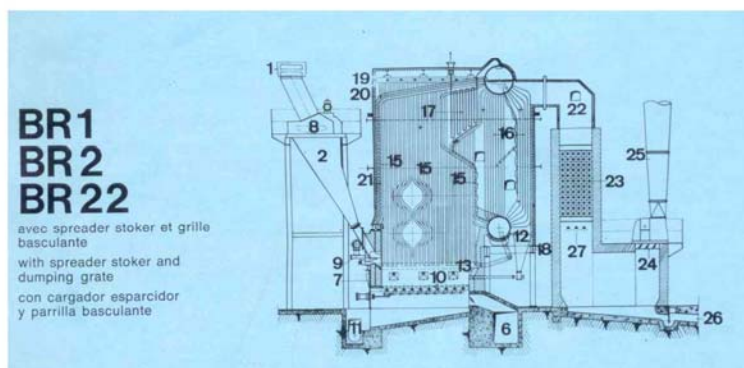
<sup>1</sup> Source: <http://www.cnim.com>

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The boiler is designed for firing with bagasse with a moisture content not exceeding 50% by weight. In addition, the efficiency of the boiler is estimated to be around 80%. The boiler is of a well-proven design.

See below a flow diagram provided by the project developer:

- 1 Alimentador de bagazo
- 2 Canaletas de alimentación
- 3 Puerta para la madera
- 4 Hogar de cuba
- 5 Toberas de aire
- 6 Conducto de aire y registros
- 7 Puertas de extracción de cenizas
- 8 Alimentador de velocidad regulable
- 9 Lanzador de bagazo
- 10 Parrilla fija con elementos basculantes
- 11 Canal de evacuación de cenizas
- 12 Tolva de hollín, con dispositivo de reinyección de hollines
- 13 Toberas de aire secundario
- 14 Parrilla giratoria
- 15 Paredes tubulares
- 16 Haz vaporizadora
- 17 Recalentador
- 18 Estructura soporte
- 19 Envoltura de chapa
- 20 Revestimiento aislante
- 21 Recubrimiento refractario
- 22 Conducto de humos
- 23 Economizador o calentador de aire
- 24 Cortatiro de tipo inducido
- 25 Chimenea de tiro mecánico
- 26 Evacuación de hollines
- 27 Separación húmeda de polvo



The plant pre-treatment process consists basically in a shredding and a drying process. The shredding process utilises a design, whereby the biomass is broken into smaller particles. The drying process ensures that the biomass moisture content does not exceed 50%, in order to enhance flame stability and optimise combustion efficiency in the boiler.

The boiler can also use other types of fuels, particularly diesel. In case there is a shortage of bagasse, they will use diesel for steam generation. This will then be taken into account

During maintenance periods or in case the boiler has to be stopped, the old coal boiler will be used for the steam supply.

The proposed site is close to both the steam consumers and the fuel supply source.

In summary, the Clean Development Mechanism will foster the gradual transition from fossil fuel use to use of a fuel that is renewable, and clean by:

- Demonstrating to local banks and financial institutions the value of RE projects.
- Providing additional income from the sale of Certified Emission Reductions (CERs) which will provide additional security against higher project risks e.g. longer downtime because of a lack of qualified maintenance personnel domestically, or problems with the high moisture content of the fuel.

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- Providing an incentive for industry owners to move away from the prevailing practice of open burning organic materials, and instead using it as a clean renewable fuel source.

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

**A.4.1.1. Host Party(ies):**

Morocco

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

Meknes

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

Mechraa Belksiri

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

The project has the following address:  
BELKSIRI, Mechraa Belksiri, Province de Sidi Kacem.

The plant is located about 1 km from Mechraa Belksiri's town center, see the following map:



Map of the location of the plant

The exact location of the project is defined using GPS coordinates N34°34'54.52" Latitude, W5°58'33.07" Longitude.

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

The project falls under UNFCCC sectoral scope 1: Energy industries (renewable/non-renewable sources).

The project conforms to the project category I, since the project reduces anthropogenic emissions by sources while maintaining a delivered capacity of less than 45 MWth. Following the boiler's manufacturer specifications, the project will have a thermal generation capacity of 40 MWth<sup>2</sup>, hence it falls under the small scale applicability conditions.

<sup>2</sup> See document named: "Babcock Installed Capacity BRII".

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

Please indicate the chosen crediting period and provide the total estimation of emission reductions as well as annual estimates for the chosen crediting period. Information on the emissions reductions shall be indicated using the following tabular format.

For type (iii) small-scale projects the estimation of project emissions is also required.

Years	Annual estimation of emission reductions in tonnes of CO <sub>2</sub> e
June to December 2008	14,432
2009	28,864
2010	28,864
2011	28,864
2012	28,864
2013	28,864
2014	28,864
January to May 2015	14,432
*After the initial 7-year crediting period, the baseline will be reassessed, generating a new estimate of emissions reductions yet to be determined.	
<b>Total estimated reductions (tonnes of CO<sub>2</sub>e)</b>	202,048
<b>Total number of crediting years</b>	21
<b>Annual average over the crediting period of estimated reductions (tonnes of CO<sub>2</sub>e)</b>	28,864

Note: Annual emission reductions are the combined total from both methodologies AMS I.C and AMS III.E

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

There is no public funding for this project.

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

Based on information provided in Appendix C, this project is not a debundled component of a larger project activity since the project participants have not registered nor operated another project in the region surrounding the project boundary.

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

The following approved baseline and monitoring methodologies are applicable to the project activity:

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- Type I.C. (reference AMS-I.C.) – “*Thermal energy for the user with or without electricity*” – for the steam generation component of the project activity, Version 12,.

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

The project conforms to the project category I.C. since the project is a renewable energy facility (using biomass) that reduces anthropogenic emissions by sources while maintaining an installed capacity below 45 MWth.

**B.3. Description of the project boundary:**

As referred to in Appendix B for small-scale project activities:

- The project boundary for type I.C. (AMS-I.C.) projects is the physical, geographical site of the renewable energy generation. In this case, the project boundary refers to the biomass plant and the site where the fuel combustion affected by the fuel-switching measure occurs.

**B.4. Description of baseline and its development:**

Date of completing the final draft of this baseline: 22/02/2008

The baseline study was prepared by:

EcoSecurities Tel: +44 (0)1865 296 923

(Contact: Andreu Tobella, andreu.tobella@ecosecurities.com)

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

According to Attachment A of 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 produced by conducting an analysis of the following: (a) investment barriers, (b) technological barriers, and (c) prevailing practice. 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.

The following four different scenarios were considered:

- Stock-pilling the biomass in the facility area where this by-product is generated.
- Open air burning of the biomass
- The proposed project not undertaken as a CDM project activity
- The proposed project undertaken as a CDM project activity

Stock-pilling the biomass waste in the facility area can be considered as a temporary solution but never as a permanent one since in an industrial area it is not viable to keep huge piles of waste. As a result, the most likely scenario without the process activity and the cheapest waste management option is the open burning of the bagasse.

- a) Investment Barriers

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Since the project will be generating financial and economic benefits other than CDM related income, then a benchmark analysis approach will be used. The likelihood of development of this project will be determined by comparing the project IRR (with and without carbon credit revenues) with a reasonable benchmark for waste management projects. Following the “Tool for the demonstration of the additionality (Version 4)”, financial benchmarks such as the IRR that we will be using for this comparison, can be obtained from an independent financial expert. Hence Dar Alkhibra was contacted in order to have the abovementioned assessment<sup>3</sup>. In this assessment, it is concluded that an expected IRR for bagasse power plants projects should be between 16% and 18%. For our comparison analysis, the most conservative of these values has been taken, this one being 16%.

The table below illustrates the financial analysis for the project activity with and without carbon finance. As shown, the project IRR without CDM related incomes is much lower than the IRR considered as a benchmark. This therefore indicates that the project without carbon revenues is not financially attractive.

**Table B.3.1**– Summary of project financial analysis

	without carbon	with carbon
IRR (21 years)	12.55%	15.64%

See attachment “Surac Bagasse Project IRR Financial Analysis.pdf”

A sensitivity analysis was conducted by altering the following parameters:

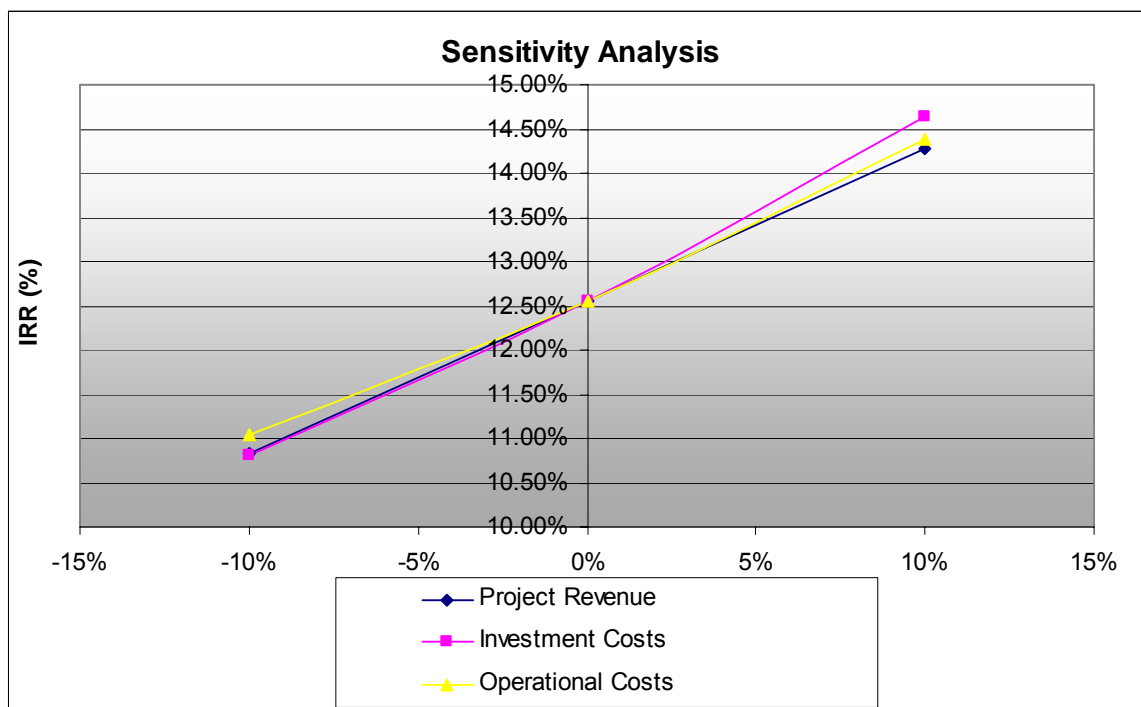
- Project Revenue
- Investment Costs
- Operational Costs

Variations of  $\pm 10\%$  have been considered in the critical assumptions. Table B.3.2 summarizes the results of the sensitivity analysis, while Figure B.3.1 provides a graphic depiction.

**Table B.3.2** Results of the sensitivity analysis

<b>Sensitivity Analysis</b>			
IRR	-10%	0%	10%
Project Revenue Increase	10.83%	12.55%	14.27%
Capital Costs Increase	10.80%	12.55%	14.63%
Operational Costs Reduction	11.04%	12.55%	14.39%

<sup>3</sup> See document: “Evaluation du risque d’un projet de chaudiere a bagasse au Maroc”



**Figure B.3.1** Different parameters affecting the project's IRR

These results show that even under very favourable circumstances the Project IRR is still lower than the benchmark. Therefore we can conclude that the Best Case IRR is not financially attractive, and therefore that the project overall is also not financially attractive.

### Conclusion:

The approval and registration of the project as a CDM project and the attendant benefits and incentives derived from the project activity will alleviate the previous barriers and thus enable the project activity to be undertaken and the emissions reduced. Without CDM revenues, it would be unlikely that the identified barriers would have been overcome and thus the project could not have been undertaken.

The impacts of considering the project as a CDM projects are the followings:

- Investment Barriers:

The sale of carbon credits under the CDM acts as another revenue stream into the project. A forward contract for the sale of carbon credits, with a price denominated in hard currencies, over a seven-year period provides additional incentives for the project developer to release the capital required to go ahead with the project.

- Other benefits from the project's implementation:

With the current baseline scenario, local communities complain for the particulate pollution<sup>4</sup>. This type of atmospheric contamination is originated by the bagasse open air burning, causing thus environmental

<sup>4</sup> See question number 4 raised during the project's stakeholders consultation

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problems like fog and allergies in the surrounding local communities. This will then be avoided by the installation of this new boiler that will have an automatic system to regulate the burning process ensuring a complete combustion. In addition, its 45m high stack will at the same time ensure a complete dispersion of the remaining particulates, eliminating completely then the pollution problem.

**B.6. Emission reductions:**

**B.6.1. Explanation of methodological choices:**

The project will claim emission reductions through the displacement of coal usage for steam generation.

The maximum boiler's capacity specified by the manufacturer is 40 MW<sup>2</sup>. As a result, the project is eligible for the small scale methodology AMS-I.C to claim for the displacement of natural gas through steam generation from biomass.

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

Data and parameters for the thermal energy generation component calculation using AMS-I.C:

<b>Data / Parameter:</b>	$\eta_{th}$
Data unit:	-
Description:	Fossil fuel boiler's efficiency.
Source of data used:	calculated
Value applied:	88.2%
Justification of the choice of data or description of measurement methods and procedures actually applied :	See Annex 6 for further details in calculations.
Any comment:	

<b>Data / Parameter:</b>	<b>EF CO<sub>2</sub></b>
Data unit:	tCO <sub>2</sub> /TJ
Description:	Emission factor per unit of energy of the fuel used in the baseline
Source of data used:	calculated
Value applied:	98.2667
Justification of the choice of data or description of measurement methods and procedures actually applied :	Since the type of coal used in the baseline is anthracite, its emission factor has been taken from the 2006 IPCC guidelines.
Any comment:	

<b>Data / Parameter:</b>	$\eta_{bb}$
Data unit:	-

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Description:	Bagasse boiler's efficiency.
Source of data used:	Boiler manufacturer
Value applied:	80%
Justification of the choice of data or description of measurement methods and procedures actually applied :	See boiler's manufacturer specifications.
Any comment:	

<b>Data / Parameter:</b>	$NCV_{ff}$
Data unit:	TJ/tonne of fossil fuel
Description:	Fossil Fuel net calorific value.
Source of data used:	2006 IPCC Guidelines
Value applied:	0.0267
Justification of the choice of data or description of measurement methods and procedures actually applied :	The value applied here is the one corresponding to coal since this is the fossil fuel most likely to be used.
Any comment:	

<b>Data / Parameter:</b>	$SP_{ff}$
Data unit:	tonne of fossil fuel /TJ
Description:	Fossil fuel specific fuel consumption
Source of data used:	calculated
Value applied:	29.96
Justification of the choice of data or description of measurement methods and procedures actually applied :	See formula used for the calculation in section B.6.3.
Any comment:	

<b>Data / Parameter:</b>	$NCV_{bagasse}$
Data unit:	TJ/tonne of bagasse
Description:	Bagasse net calorific value.
Source of data used:	calculated
Value applied:	0.007823
Justification of the choice of data or description of measurement methods and procedures actually applied :	This value has been taken from the following source: <a href="http://www.sugartech.co.za/extraction/bagasseCV/index.php">http://www.sugartech.co.za/extraction/bagasseCV/index.php</a>

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Any comment:	
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<b>Data / Parameter:</b>	SP <sub>bagasse</sub>
Data unit:	TJ/tonne of diesel
Description:	Bagasse specific fuel consumption
Source of data used:	calculated
Value applied:	102.26
Justification of the choice of data or description of measurement methods and procedures actually applied :	See formula used for the calculation in section B.6.3.
Any comment:	

### B.6.3 Ex-ante calculation of emission reductions:

#### Baseline emission reductions calculations:

In the absence of this project activity, the project developer would have to generate the steam with boilers using coal as fuel.

Hence, for steam/heat produced using fossil fuels the baseline emissions are calculated as follows:

$$BE_y = HG_y \times \frac{EF_{CO_2}}{\eta_{th}}$$

where:

BE<sub>y</sub>: the baseline emissions from steam/heat displaced by the project activity during the year y in tCO<sub>2</sub>e.

HG<sub>y</sub>: the net quantity of steam/heat supplied by the project activity during the year y in TJ.

EF<sub>CO<sub>2</sub></sub>: the CO<sub>2</sub> emission factor per unit of energy of the fuel that would have been used in the baseline plant in (tCO<sub>2</sub>/ TJ), obtained from reliable local or national data if available, otherwise, IPCC default emission factors are used.

η<sub>th</sub>: the efficiency of the boiler using fossil fuel that would have been used in the absence of the project activity.

The net quantity of steam/heat supplied by the project will be monitored accordingly in order to evaluate the exact quantity of steam delivered. In case the project does not have more bagasse available, they may use fossil fuel for the required steam generation.

As a result and according to methodology AMS-I.C, both quantities of bagasse (Q<sub>bagasse</sub>) and fossil fuel (Q<sub>ff</sub>) will be monitored. In order to then evaluate the amount of thermal energy from renewable sources, two ways to calculate it shall be used.

As described in AMS-I.C, the first of those consists in adjusting the thermal energy metered value to deduct the thermal energy from fossil fuels using the specific fuel consumption and the quantity of fossil

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fuel consumed. The second will be calculated using the specific fuel consumption and the amount of biomass used. The lower of the two values should then be used to calculate emission reductions.

Both specific consumptions will be determined ex-ante. The generic formula used to calculate those two parameters is the following:

$$SP_{\text{fuel}} = \frac{\eta_{\text{bb}}}{\text{NCV}_{\text{fuel}}}$$

Where:

$SP_{\text{fuel}}$ : specific fuel consumption, consumption per unit of thermal energy or electricity generated (tonne of fuel/TJ).

$\text{NCV}_{\text{fuel}}$ : the fuel Net Calorific Value (TJ/tonne of fuel).

$\eta_{\text{bb}}$ : the efficiency of the project's bagasse boiler.

Finally, the net quantity of steam supplied by the project activity during the year  $y$  ( $HG_y$ ) will be calculated using the following parameter that will be monitored (see section B.7.1):  $Q_{\text{steam}}$ ,  $T_{\text{steam}}$ ,  $P_{\text{steam}}$ .

### **Project emissions calculations**

For AMS-I.C, the project emissions would come from either heat either electricity either fossil fuel consumption by the project activity. Since neither heat nor electricity will be consumed by the project or in the project boundary, just project emissions coming from the fossil fuel combustion for steam generation in the project's new installed boiler should be taken into account. However, any quantity of steam produced from fossil fuels in the boilers will be monitored accordingly. The net quantity of steam/heat ( $HG_y$ ) used for the emission reduction calculations will then only be the one generated exclusively from biomass combustion. As a result, emissions from this fossil fuel consumption have already been taken into account in the baseline calculations (see paragraph above) and do not need to be considered as project emissions.

In conclusion, there are no project emissions from the project activity.

### **Project leakage**

For AMS-I.C, since no energy generation equipment will be transferred to or from another activity; hence leakage effects do not need to be accounted for.

In addition, following the "General guidance on leakage in biomass project activities", there are three main sources of leakage for that type of project: shifts of pre-project activities, emission related to the production of the biomass, competing uses for the biomass. Since the project will be using bagasse as fuel and this product is a biomass residue or waste from industries, only leakage from competing use of biomass is applicable.

Since the project is planning to use all the available bagasse from Surac's sugar mills, this leakage shall be estimated and deducted from the emission reductions. It is demonstrated in Annex 7 that all the bagasse that is produced by Surac's sugar mill would otherwise be left to decay on fields and burn afterwards in open air. Since no other activity would involve the bagasse surplus, no leakage emission can be accounted for nor deducted from the project emission reductions.

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

Steam generation component for AMS-I.C small scale methodology:

Years	Estimation of baseline emissions (tonnes of CO <sub>2</sub> e)	Estimation of project activity emissions (tonnes of CO <sub>2</sub> e)	Estimation of leakage (tonnes of CO <sub>2</sub> e)	Estimation of emission reductions (tonnes of CO <sub>2</sub> e)
June to December 2008	14,432	0	0	14,432
2009	28,864	0	0	28,864
2010	28,864	0	0	28,864
2011	28,864	0	0	28,864
2012	28,864	0	0	28,864
2013	28,864	0	0	28,864
2014	28,864	0	0	28,864
January to May 2015	14,432	0	0	14,432
Total (tonnes of CO <sub>2</sub> )	202,048	0	0	202,048

Years	Annual estimation of emission reductions over the chosen crediting period
June to December 2008	14,432
2009	28,864
2010	28,864
2011	28,864
2012	28,864
2013	28,864
2014	28,864
January to May 2015	14,432
Total estimated reductions (tonnes of CO <sub>2</sub> )	202,048
Total number of crediting years	21
Annual average over the crediting period of estimated reductions (tonnes of CO <sub>2</sub> )	28,8364

**B.7 Application of a monitoring methodology and description of the monitoring plan:**
**B.7.1 Data and parameters monitored:**

Data to be monitored for AMS-I.C:

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<b>Data / Parameter:</b>	$Q_{\text{steam}}$
Data unit:	Tonnes/hr
Description:	Net quantity of steam supplied by the project activity.
Source of data to be used:	Measured
Value of data	-
Description of measurement methods and procedures to be applied:	This parameter will be measured using flow meter.
QA/QC procedures to be applied:	Meters will be calibrated periodically in line with manufacturer's recommendations.
Any comment:	

<b>Data / Parameter:</b>	$T_{\text{steam}}$
Data unit:	Degrees
Description:	Temperature of steam supplied by the project activity.
Source of data to be used:	Measured
Value of data	-
Description of measurement methods and procedures to be applied:	This parameter will be measured using flow meter.
QA/QC procedures to be applied:	Meters will be calibrated periodically in line with manufacturer's recommendations.
Any comment:	

<b>Data / Parameter:</b>	$P_{\text{steam}}$
Data unit:	Bar
Description:	Pressure of steam supplied by the project activity.
Source of data to be used:	Measured
Value of data	-
Description of measurement methods and procedures to be applied:	This parameter will be measured using flow meter.
QA/QC procedures to be applied:	Meters will be calibrated periodically in line with manufacturer's recommendations.
Any comment:	

<b>Data / Parameter:</b>	$Q_{\text{bagasse}}$
Data unit:	Tonnes
Description:	Quantity of bagasse combusted in the boiler

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Source of data to be used:	Measured
Value of data	50,000
Description of measurement methods and procedures to be applied:	This parameter will be measured using weighting system. Further details will be given in the project's monitoring plan.
QA/QC procedures to be applied:	According to national standards, weighting systems will be calibrated periodically.
Any comment:	

<b>Data / Parameter:</b>	$Q_{ff}$
Data unit:	Tonnes
Description:	Quantity of fossil fuel combusted in the boiler
Source of data to be used:	Measured
Value of data	0
Description of measurement methods and procedures to be applied:	This parameter will be measured using weighting system. Further details will be given in the project's monitoring plan.
QA/QC procedures to be applied:	Meters will be calibrated periodically in line with manufacturer's recommendations.
Any comment:	

### **B.7.2 Description of the monitoring plan:**

Quality control and quality assurance procedures will guarantee the quality of data collected. All meters will undergo maintenance subject to manufacturer's requirements. Moreover, all monitoring equipment is calibrated regularly by qualified personnel in line with manufacturer's specifications or once in three years, whichever is earlier.

Data from the steam meters collected is used for invoicing and hence measured with utmost care. Any auxiliary fuel and/or electricity consumed will be determined on the basis of invoices.

With regards to quality control, project proponents will be providing relevant quality control and assurance procedures when plant operations start. The project site will use these systems to ensure that data collected for the project are subject to the most rigid quality control systems.

Site staff will be trained to operate relevant equipment and collect data required.

At the end of each month the monitoring data needs to be filed electronically. The electronic files need to have regular back-up. The project developer needs to keep relevant sales and purchase invoices.

All the data shall be kept until two years after the end of crediting period.

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Prior to the start of the crediting period, the organisation of the monitoring team will be established. Clear roles and responsibilities will be assigned to all staff involved in the CDM project.

Data will be read off all CDM monitoring relevant equipment and collected on site by the plant operation personnel. This information will be transferred to EcoSecurities regularly in order to monitor emission reductions.

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

**SECTION C. Duration of the project activity / crediting period**

**C.1 Duration of the project activity:**

**C.1.1. Starting date of the project activity:**

The plant started operation the 01/06/08.

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

21y-0m

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

**C.2.1. Renewable crediting period**

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

01/06/2008 or the date of registration, whichever is the latest.

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

7y-0m

**C.2.2. Fixed crediting period:**

**C.2.2.1. Starting date:**

N/A

**C.2.2.2. Length:**

N/A

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#### **SECTION D. Environmental impacts**

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

An analysis of the environmental impacts of the project is not required by the host Party. The legislation states that this assessment is just a mandate for power station with capacity higher than 300 MW.

##### **D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:**

Environmental impacts as described in section A.1 are not considered significant neither by the project participants neither by the host country.

#### **SECTION E. Stakeholders' comments**

The process followed to collect stakeholders' comments was a public brief session organised by Cosumar and EcoSecurities. A meeting was advertised through the distribution of invitations to inform all potential stakeholders of the consultation event. The event was held on 18 October 2007, at the plant where the project will be installed owned by Surac.

The general outline of the presentation was:

- The consultation event entailed a presentation with an introduction to the Kyoto Protocol and the CDM
- A presentation with how the project fits within the CDM.
- A session of questions and answers with participation of the audience.

Annex 5 contains additional information regarding stakeholders' consultation, the list of participants and questions and answers.

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

Local stakeholders were invited for a public stakeholder consultation in the Mechraa Belksiri's sugar cane factory on the 18<sup>th</sup> of October 2007. The participants, their comments and the answers are compiled in annex 5.

##### **E.2. Summary of the comments received:**

Please see annex 5.

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

Please see annex 5.

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**Annex 1****CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY**

Organization:	SURAC
Street/P.O.Box:	BP:78, Sidi Yahia du Gharb
Building:	
City:	Dar El Gueddari
State/Region:	Sidi Kacem
Postfix/ZIP:	
Country:	Morocco
Telephone:	+212 (37) 31.09.62 /63/64
FAX:	+212 (37) 31.09.61
E-Mail:	
URL:	
Represented by:	M.Mohammed FIKRAT
Title:	Président Directeur Général
Salutation:	
Last Name:	
Middle Name:	
First Name:	
Department:	
Mobile:	
Direct FAX:	
Direct tel:	+212 (22) 67.84.40
Personal E-Mail:	<a href="mailto:m.fikrat@cosumar.co.ma">m.fikrat@cosumar.co.ma</a>

Organization:	EcoSecurities Group ltd
Street/P.O.Box:	40/41 Park end Street
Building:	
City:	Oxford
State/Region:	
Postfix/ZIP:	OX1 1JD
Country:	United Kingdom
Telephone:	+44 1865 202 635
FAX:	+44 1865 251 438
E-Mail:	<a href="mailto:cdm@ecosecurities.com">cdm@ecosecurities.com</a>
URL:	<a href="http://www.ecosecurities.com">www.ecosecurities.com</a>
Represented by:	
Title:	Managing Director
Salutation:	Dr.
Last Name:	Moura Costa
Middle Name:	
First Name:	Pedro
Department:	
Mobile:	



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Direct FAX:	+44 1865 251 438
Direct tel:	+44 1865 202 635
Personal E-Mail:	cdm@ecosecurities.com

**Annex 2**

**INFORMATION REGARDING PUBLIC FUNDING**

The project received no public funding from any annex 1 party.

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**Annex 3**

**BASELINE INFORMATION**

See sections above.

**Annex 4**

**MONITORING INFORMATION**

See sections above.

**Annex 5****PARTICIPANTS ATTENDING CDM STAKEHOLDER / PUBLIC CONSULTATION FOR SURAC'S BAGASSE PLANT PROJECT, MOROCCO**Venue: Mechraa Belksiri's sugar cane factory, Date: 18<sup>th</sup> October 2007

No.	Name and Surname	Designation
1	Mohamed Hatim	Pacha de la ville M.B.Ksiri
2	Taher Gallaf	Chef de cercle M.B.Ksiri
3	Mohamed Laassel	Député et Président du conseil municipal de la ville M.B.Ksiri
4	Mostapha Chaoui	Député du cercle Souk Larbaa du Gharb
5	Larbi Rafiq	Commissaire chef de la police De M.B.KSIRI
6	Mostapha Kadmiri	Chef de la protection civile –M.B.Ksiri
7	El Ouazzani El Haddadi	Directeur de l'association des producteurs des plantes sucrières du Gharb
8	Abdelaziz Aaouich	Délégué provincial de l'emploi
9	Abdeljaouad Slaoui	Directeur General adjoint de SURAC
10	Mohamed Azzouzi	Directeur d'usine SUNABEL M.B.Ksiri
11	Salah Nahid	Directeur d'usine SURAC M.B.Ksiri
12	Ali El Moujahid	Directeur développement
13	Mohamed Boukraichi	COSUMAR sa.
14	Ali Agoumi	Ecosecurities
15	Driss El Yousfi	Chef de production SUNABEL M.B.Ksiri
16	Slimane Taleb	Chef de Division production SUNABEL M.B.Ksiri
17	Mostapha Rguig	Responsable RH et juridique
18	Mostapha Touabi	Delegué du Personnel
19	Abdelkrim Oubenaissa	Ingénieur en chef- Cercle M.B.Ksiri
20	Mohamed Daoudi	Inspecteur de travail
21	Mokhtar Kattaoui	Association des producteurs des plantes sucrières du Gharb
22	Omar Zeggari	Circonscription de la police
23	Lakbir Mensar	Cercle de mise en valeur agricole ORMVAG
24	Leila STOUR	Ecosecurities

**Questions raised and answered during the stakeholder consultation**

Question	Answer
1. What is the CDM? (Mr. Mostapha Chaoui)	CDM is the mechanism established by the Kyoto protocol that allows developers from projects that increase the energy efficiency to sell the carbon emission reductions obtaining an extra income that helps increasing the project's pay-back. (Mr. Ali Agoumi)
2. The CDM mechanism will add revenue streams to SURAC. What are its impacts on the agricultural	SURAC uses the CDM mechanism to benefit from carbon revenues that make the project become

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sector and the region? (Mr. Ouazzani Haddadi)	feasible. It is important to note that the investment required for this project is 55 million dirhams. When the boiler will be installed, the project will encourage both the sugar cane sector to increase their bagasse production, and the beet sector for which a renewable fuel displacing fossil fuels will be used. This will increase the region's development and the agricultural sector revenues. (Mr. A. Slaoui)
3. Will the project create new employment? (Mr. Mohammed Hatim)	In a first instance, the project will generate employment for both the operation and maintenance of the boiler. In a long term, the beet and sugar cane sector development will promote new employment in the agricultural sector. (Mr. Azzouzzi)
4. Local communities complain for the particulate pollution. Will the project offer a solution to this problem? (Mr. Mohammed Laassel)	Bagasse open burning is the origin of this particulate pollution. The new boiler will have an automatic system to regulate the process ensuring a complete combustion. Its 45m high stack will also ensure a complete dispersion of the remaining particulates, eliminating this particulate pollution problem. (Mr. A. El Moujahid)
5. What is COSUMAR's strategy regarding the sugar sector's development and the farmer's income improvement? (Mr. Ouazzani Haddadi)	<p>COSUMAR is aware of its responsibility towards its partners after the national sugar cane industries' acquisitions. As a result, a strategy to be more established in its environment has been developed. This strategy covers amongst others, the following points:</p> <ul style="list-style-type: none"> <li>- Helping local farmers optimizing the sugar sector common practices, thus increasing their revenues.</li> <li>- Development and modernisation of the industrial sector through significant investments to reach international standards, to be prepared for future market challenges.</li> <li>- Development of synergies between beet and sugar cane to reinforce the establishment of these practices which constitute an important activity for farmers in the region. It can be noticed that this project is a first milestone of this strategy.</li> </ul> <p>(Mr. A. Slaoui)</p>

See below the original documents used for the above tables:

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اليوم الدراسي حول إنشاء محطة حرارية  
لمعالجة ثفل قصب السكر  
يوم 18 أكتوبر 2007  
لائحة الحضور

ملاحظة	التوقيع	الصفة	الاسم الكامل
		باشا مدينة مشرع بلقصري	محمد حاتم
		رئيس دائرة مشرع بلقصري	طاهر كلاف
		نائب برلماني و رئيس المجلس البلدي مشرع بلقصري	محمد لعسل
		نائب برلماني عن دائرة سوق الاربعاء الغرب	مصطفى الشاوي
		رئيس مفوضية الشرطة مشرع بلقصري	العربي رفيق
		رئيس تكتة الوقاية المدنية	مصطفى القديري
		رئيس جمعية منتجي النباتات السكرية بالغرب	الوازاني الحدادي
		مذوب شغل إقليم سيدي قاسم	عبد العزيز أعويش
		رئيس دائرة التنمية الفلاحية مشرع بلقصري	الهالتي عبد اللطيف
		رئيس سرية الدرك الملكي مشرع بلقصري	محمد عبيد
		مدير عام لمجموعة سوراك	محمد جواد الخطابي
		مدير عام بالنيابة لمجموعة سوراك	عبد الجواد سلاوي
		مدير عام بالنيابة لمجموعة سونايل	قدوري عبد الجليل
		مدير معلمي سونايل سيدي غلال النازي/ مشرع بلقصري	محمد العزوي
		مدير معلمي سوراك دار الكداري / مشرع بلقصري	صلاح ناهض
		مدير الدراسات	علي مجاهد
		عن كوزيمار ش.م.	محمد بوقريشي
		خبير إيكوسكورتيست	علي أكومي
		مسؤول عن الإنتاج سونايل بلقصري	البيدوهي إدريس
		رئيس قسم الإنتاج سونايل بلقصري	الخالق سليمان
		مسؤول عن الموراد البرية والمحلة الخازنة	الوكيل مصطفى



28 Nov 2007 10:39 SURAC FAX 037310037 p. 2



**كوسومار**  
COSUMAR

**surac**

**سوراك**

معامل السكر والتكرير للصب  
SUCRERIES RAFFINERIES DE CANNES  
Société Anonyme au Capital de 296.926.800 DHS

15 أكتوبر 2007  
444/07

**الموضوع: حول إنشاء محطة حرارية**

سلام تام بوجود مولانا الإمام و بعد،

في إطار المشروع التكاملي لشركتي سوراك وسونابيل سيتم إنشاء محطة حرارية تستعمل  
تفلن قصب السكر بديلا للحم الحجري كمصدر للطاقة.

وبما أن هذا المشروع يدخل في إطار المشاريع ذات الصلة بالاحتباس الحراري والحد من  
انبعاث غاز ثاني أكسيد الكربون باستعمال مصدر للطاقة المتجددة الذي يمثل قصب السكر، بشرطنا  
أن ندعوكم لحضور اليوم الدراسي الذي سينضم يوم 18 أكتوبر 2007 على الساعة العاشرة  
صباحا بمعمل قصب السكر بمشروع بلقصيري.

وتقبلوا سيدي فائق التقدير والاحترام.

والسلام

امضاء  
معامل السكر والتكرير للصب  
مدير عام  
صيد الجواد سلاوي

		
Usine KCEBYA Dar Gueddari  (037).30.09.62/63/64  (037).30.09.61	Usine Mechraa Bel Ksiri  (037).90.62.56  (037).90.60.68	Usine El Aouamra  (039).91.25.51  (039).91.24.44

See below the English translation of the above letter:

“

To the President of the Sugar Plant Producer's Association in Morocco  
Subject: Installation of a boiler.

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Within the new working frame between SURAC and SUNABEL, a new boiler using bagasse and displacing coal will be installed.

Since this project fits as a type of project that reduces the CO<sub>2</sub> emissions and reduces the greenhouse gas effect through the utilisation of renewable energy from the sugar cane, we are pleased to invite you to an informative session that will be held on the 18 of October at 10am in the sugar cane factory in Mechraa Belksiri.

Yours sincerely,

Signature  
SURAC sugar cane factories  
Assistant General Director  
Abdeljaouad SLAOUI

“

## Annex 6

**INFORMATION REGARDING CALCULATIONS AND SOURCES.**

<b>Coal Boiler Efficiency ex-ante calculations</b>			
<b>Parameter</b>	<b>Value</b>	<b>Unit</b>	<b>Source/Comments</b>
Historical Steam production	92,418	tonnes/yr	Client
Historical Steam production	258.8	TJ/yr	Calculated
Historical Coal consumption	10,991	tonnes/yr	Client
Coal net calorific value	0.0267	TJ/tfuel	IPCC 2006
Historical Coal consumption	293.5	TJ/yr	Calculated
$\eta_{th}$	88.2%		

## Annex 7

**BIOMASS LEAKAGE ASSESSMENT IN MECHRA BEL KSIRI, MOROCCO**

As defined in the “General guidance on leakage in biomass project activities”, since bagasse is considered as a biomass residue or waste, only emissions from competing use of biomass has to be considered for the leakage assessment.

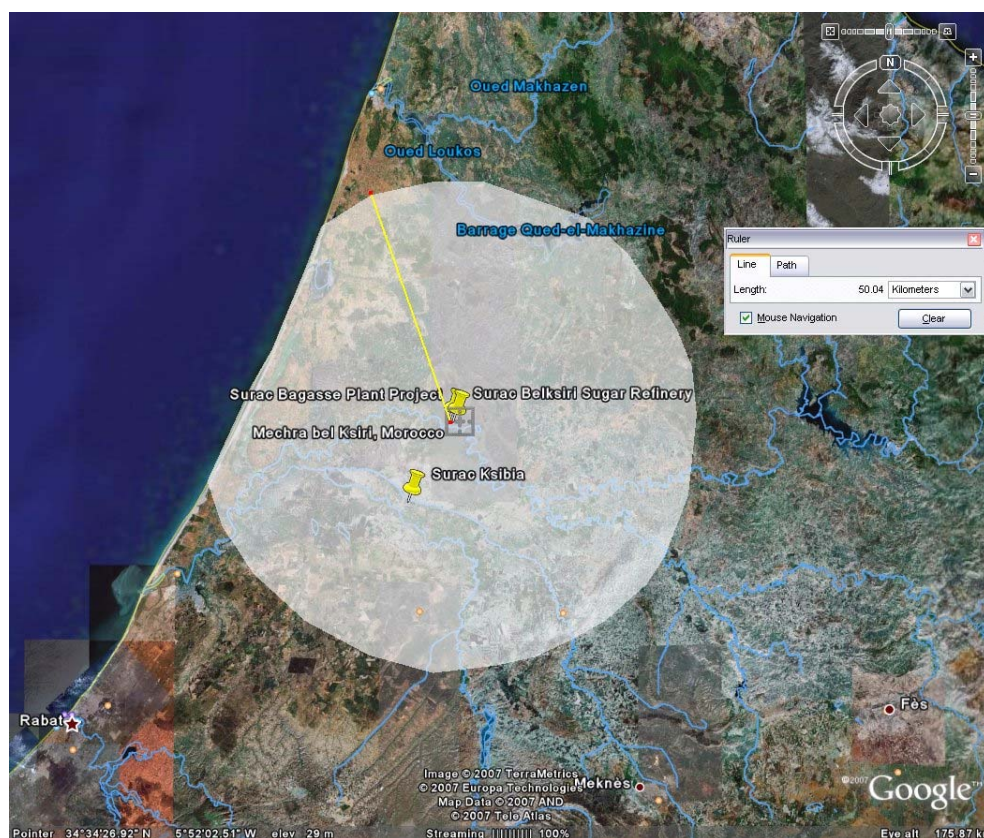
In order to demonstrate that no other activity would be using the bagasse surplus from its production points in the region (50 km surrounding the project location), the following steps were followed:

- In the first place, we did analyse all the sources where this specific by-product was generated.
- In the second place, another study was done to analyse the possible uses for this bagasse in the region.

The conclusions from the abovementioned analysis are described at the end.

**Potential bagasse sources in the region:**

The mentioned region where these potential sources were searched was considered to be in a 50 km radius from the project activity’s location. See below the area considered:



*Image taken from the Google Earth engine*

Only two are the number of sugar cane refineries in the region described above. Those are the following:

- Surac Ksibia: this sugar cane refinery is located at 25 km from the project location and therefore included in the region where the study has been done. It is currently producing 120,000 tonnes of bagasse per year.
- Surac Belksiri: this sugar cane refinery is located at 1 km from the project location and therefore included in the region where the study has been done. It is currently producing 100,000 tonnes of bagasse per year.

**Competing use for the bagasse in the potential sources:**

The current uses of bagasse in each of the abovementioned refineries are the following:

- Surac Ksibia: all current bagasse production is already been used for its own electricity and steam needs. Therefore, there is no surplus of bagasse in that particular refinery.
- Surac Belksiri: from the total production of 100,000 tonnes of bagasse per year, currently 50,000 tonnes per year are already in use for the plant electricity and steam needs. The rest 50,000 tonnes/yr is the surplus that the project activity is expecting to use.

As a result, only 50,000 tonnes of bagasse per year are currently available in the region and this is the one that the project activity is aiming to use for the steam generation. Currently this bagasse is being either left to decay on fields either burned in open air either a combination of both, entailing either methane generation, widely known greenhouse gas, either atmospheric contamination that causes problems to surrounding populated areas. No other use for this by-product has been found.

**Conclusions:**

In summary then, the amount of bagasse available in the region is 50,000 tonnes per annum. According to the “General guidance on leakage in biomass project activities” and since the project activity is willing to use the full amount of available bagasse, leakage has then to be taken into account in the emission reductions estimations. However, it has been demonstrated that there is no existing usage for this biomass residue in the area. As a result, even if leakage needs to be taken into account, it is nil since the project won’t be displacing any other use, therefore there is no impact in the emission reductions estimations.



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