DORI ALIMENTOS LTDA - BIOMASS BASED PROJECT – BRAZIL

SUSTAINABLE CARBON CLIMATE SOLUTIONS

Document Prepared By Sustainable Carbon – Projetos Ambientais Ltda

Project Title	*Dori Alimentos LTDA* - Biomass based project – Brazil
Version	3.0
Date of Issue	05 – September – 2013
Project ID	332
Monitoring Period	01-November-2008 to 30-April-2013
Prepared By	Sustainable Carbon – Projetos Ambientais Ltda
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1 PROJECT DETAILS

1.1 Summary Description of Project

This project activity was developed by CantorCO2e Brazil, and is now being carried out by Sustainable Carbon – Projetos Ambientais LTDA.

The project activity is a bundle project of two production units of *Dori Alimentos LTDA* and consists in promoting the fuel switch in *Dori's* boiler. *Dori Alimentos LTDA* is a candy industry that was created in 1967. At the present time, *Dori* manufactures all kinds of candies, chocolates and peanuts in different flavours, to meet domestic and international demand. The company exports its products to 60 different countries, including Latin America, Australia, South Africa, United States and some European countries. Besides that, *Dori Alimentos LTDA* has distribution center throughout Brazil, for example, in the Northeast where it has 16 distribution units[1].

In the candies manufacturing process, steam is used in several different stages of the production process, for example in the greenhouse providing heat to dry the final products or during the production in order to increase the humidity of some candies' ingredients.

The project activity involves the use of biomass as a source of fuel to supply steam for the production process, replacing shale oil, which is the fuel commonly used. In both units, Eucalyptus and Pinus wood chips are used and in Dori's head office peanut shells are also applied. In both units, the fuel switch started in November 2004; however, the regular operation of the boiler with biomass began on August 2005 in Dori's head office and on Dori's subsidiary company on January 2005.

Since 2008, the boilers in both production units are working predominantly with renewable biomass to generate steam. There is still a minor consumption of shale oil in both units, which is related to the period of equipment maintenance or cleaning, which usually lasts from 2 to 3 hours. The amount of shale oil is responsible for 3,54% of the total energy necessary to generate steam in the boilers.

The implementation of this project activity in *Dori Alimentos LTDA* has as objective reduce the use of shale oil and substitutes it by renewable biomasses to feed boilers and generate steam to sustain the production. The intention is to minimize environmental impacts related to the consumption of fossil fuels and rmitigate greenhouse gas (GHG) emissions.

The emission reductions due to the switch of fossil fuel (shale oil) to renewable biomasses were equal to **86,386 tCO_2e** during the monitoring period from 01/11/2008 to 30/04/2013.

1.2 Sectoral Scope and Project Type

The project is associated to the following scope, as per UNFCCC definitions:

1 - Energy industries (renewable - / non-renewable sources);

This is not an AFOLU project. This is not a grouped project.

1.3 Project Proponent

[1] According to *Dori Alimentos LTDA* website. Available at: http://www.dori.com.br/a_essencia_da_dori/historico_da_empresa. Last visited on 14/08/2012.

Project Proponents

The project proponents contributed to the current report by assigning the following roles and responsibilities to:

Dori Alimentos LTDA

Industrial Establishment: Dori Alimentos LTDA

Mrs. Márcia S. Cavicchioli de Oliveira, Environmental management system coordinator is responsible to provide all information of Marília Plant and to lead the visit of the candy industry. Also, she gives detailed information on process and production lines, environmental challenges, technological challenges, research and development history and food market challenges. Furthermore, she is responsible for the monitoring data, providing the quantification of the amount of steam produced and of the amount of biomass.

Mr. Juliano Canonio Pimenta, Environmental management system coordinator is responsible to provide all information of Rolandia Plant and to lead the visit of the candy industry. Also, he is responsible for the monitoring data, providing all the information necessary for the Monitoring Report.

Other information on the project's proponent[2]:

Phone number: +55 (14) 3408-3000

Website: http://www.dori.com.br

Project Developer

This project activity was developed by CantorCO2e Brazil and now is being carried out by Sustainable Carbon – Projetos Ambientais Ltda.

As the project authorized contact, Sustainable Carbon was given the responsibility of preparing the present monitoring report and to accompany the proponents until the end of the crediting period.

The monitoring report was completed on 05/09/2013 by *Marcelo Hector Sabbagh Haddad, Camila Vaccari, Mariana dos Santos Silva, Mariana Fieri, Larissa Tega da Fonseca* and *Thiago de Avila Othero*, from *Sustainable Carbon – Projetos Ambientais LTDA.*

Other information on the project's developer's contact:

Address:
R. Doutor Bacelar, 368 – Conj. 131 – Vila Clementino
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São Paulo – SP, Brazil
Phone number: +55 11 2649 0036

Web site: http://www.sustainablecarbon.com

E-mails:marcelo@sustainablecarbon.com;camila@sustainablecarbon.com;
mariana@sustainablecarbon.com;marianas@sustainablecarbon.com;
thiago.othero@sustainablecarbon.com.

[2] Addresses of both production units of *Dori Alimentos LTDA* can be found on Section 1.7.

1.4 Other Entities Involved in the Project

No other entity is involved in this project activity.

1.5 Project Start Date

According to version 02 of the VCS PD[3], project start date was defined as the date when the project began reducing or removing GHG emissions through employment of renewable biomass.

Unity	Project Start Date
Dori's Head Office	01/03/2005
Dori's Subsidiary	01/12/2004

1.6 Project Crediting Period

The crediting period for this project started[4] on 01/04/2006 and ends on 31/03/2016.

VCS project crediting period: 10 years, two times renewable.

1.7 Project Location

The project activity is located in *Marília*, State of *São Paulo*, and *Rolândia*, State of *Paraná*, which are indicated in Figure 1. The project site has the following geographic locations and postal addresses:

-Head Office

Av. República, 5.159/85 - Distrito industrial Santo Barion - CEP 17512-035 Marília, SP, Brazil;

The coordinates are: 22° 12′ 50″ S and 49° 56′ 45″ W

-Subsidiary

Av. Itamaraty, 1324 - pq. Industrial – CEP 86600-000 Rolândia, PR, Brazil.

The coordinates are: 23° 18′ 36″ S and 51° 22′ 8″ W

[3] Document available at: <http://mer.markit.com/br-reg/public/project.jsp?project_id=100000000000292>. Last visited on 19/08/2013.

[4] Earliest credit start date under the VCS 2007. The original date was March 28th 2006, but to simplify the emission reduction account, the date of April 1st 2006 was chosen for determining the crediting period start date.

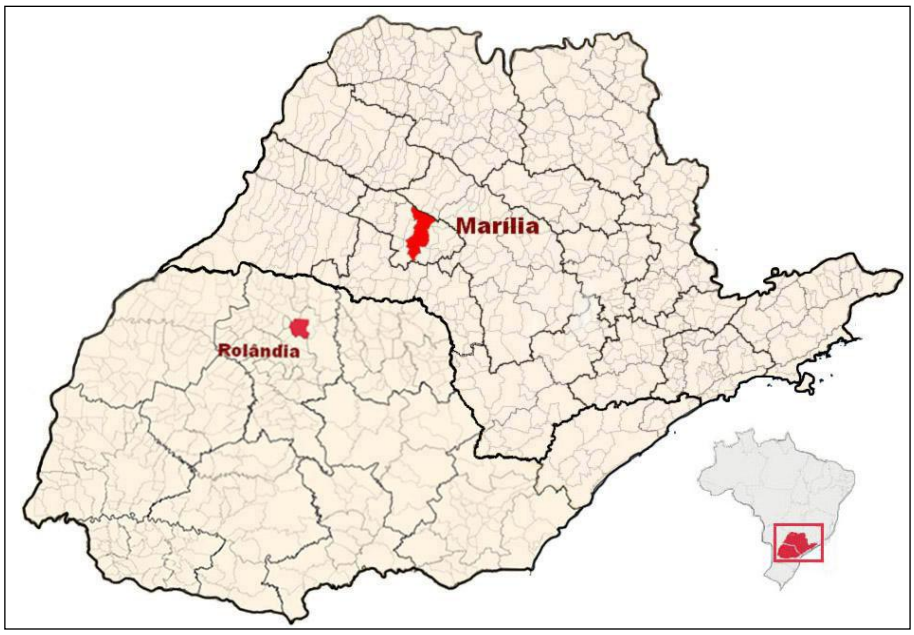

Figure 1. Geographic location of the cities of the project activity that has the following coordinates:

***Marília*: 22° 12′ 50″ S, 49° 56′ 45″ W *Rolândia*: 23° 18′ 36″ S, 51° 22′ 8″ W**

1.8 Title and Reference of Methodology

The project applies a small scale methodology approved under the Clean Development Mechanism, as follows:

Category AMS-I.C: Thermal energy for the user with or without electricity – Version 13 (Valid from March 28th, 2008 to April 07th, 2009)[5].This category comprises renewable energy technologies that supply individual households or users with thermal energy that displaces fossil fuels.

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

The project description document was validated by the Designated Operational Entity TÜV NORD Cert GmbH and this present monitoring report will be verified by Bureau Veritas Certification Holding SAS.

The project has been using renewable biomass since the starting date of the crediting period, thus mitigating their baseline emissions.

As described on the VCS PD, version 02, the amount of steam generated by the boiler will be monitored by a flow meter installed in the boilers of both Dori's units.

[5] This version of the methodology is available at: < http://cdm.unfccc.int/filestorage/C/D/M/CDMWF_AM_YL0327DQSKVFXYQREWRT3VNR58402G/EB38_repan09_AMS_I.C_ver13.pdf?t=TnR8bTczejljfDC4vzmRYQSGKJUoZqKvjYzW>. Last visited on 12/07/2012.

However, during the current monitoring period, the flow meter was not installed in the steam pipe of the boilers at Rolandia's unit. Therefore, the parameter Q_{steam} had to be recalculated. Firstly, to calculate the amount of shale oil that would have been consumed per month (in tonnes/month), the total energy provided by both shale oil and renewable biomass that were actually consumed at each month of the current monitoring period was divided by the NCV of the shale oil. Then, dividing this value by the efficiency factor of the boiler (0.074 tonne of shale oil per tonne of steam), the monthly estimate of the amount of steam generated could be obtained. In addition, as a conservative measure, among all the monthly Q_{steam} values, the lowest one was selected and therefore applied to each month of the current monitoring period. More detailed information can be seen in the VCS Calculation spreadsheet.

None of the changes described above have significant effects on the project monitoring or on its capacity to mitigate GHG emissions. The monitoring data was kept according to the monitoring plan described in the project description document. This Monitoring Report refers to the second monitoring period of this project, and includes data from 01/11/2008 to 30/04/2013.

2.2 Project Description Deviations

The registered VCS PD version 02 establishes that the project proponents (*Dori Alimentos)* would measure the amount of renewable biomasses used (parameter $Q_{renbiomass}$), the amount of steam generated (parameter Q_{steam}) and the total of shale oil consumed by the project (parameter $FC_{i,j,y}$).
During the current monitoring period, the monitored parameters were registered and organized on a spreadsheet, separately by *Dori's* units. This means renewable biomass and shale oil consumed were monitored through receipts registries. Besides that, the amount of steam generated by boilers was measured according to data from flow meter equipment. As described above, the amount of steam in *Rolândia's* unit from May, 2010 to April, 2013 was applied a correction factor.

Thus, monitored parameters were measured regarding VCS PD description, version 02.

2.3 Grouped Project

Not applicable. This is not a grouped project. The project activity is a bundled project of two production units of *Dori Alimentos LTDA*: the company's head office, situated in the city of Marília – State of São Paulo, and the subsidiary production plant, located in the city of Rolândia – State of Paraná.

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Data Unit / Parameter:	$\mathbf{EF_{shaleoil}}$
Data unit:	tCO_2/TJ
Description:	CO_2 Emission factor of shale oil
Source of data:	Value checked at:

	-IPCC: Intergovernmental Panel on Climate Change. Available at: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf. Last visited on 13/07/2012.
Value applied:	73.3 tCO_2/TJ
Purpose of the data:	This parameter was used to calculate baseline emissions from the use of the fossil fuel that would be used in the baseline scenario. Also, it was used to calculate the project emissions.
Any comment:	Applicable for stationary combustion in the manufacturing industries and construction. The fossil fuel likely to be used by similar consumers is taken the IPCC default value of residual fossil fuel. Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits income for this project activity, whichever occurs later.

Data Unit / Parameter:	$\mathbf{NCV_{shaleoil}}$
Data unit:	TJ/tonne of shale oil
Description:	Net Calorific Value
Source of data:	Value average checked at: IPCC - Intergovernmental Panel on Climate Change. Available at: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf. Last visited on 13/07/2012.
Value applied:	0.0381
Purpose of the data:	This value provides the energy generated by the amount of shale oil that would be used in the absence of the project and the energy generated by the amount of shale oil consumed in the current period.
Any comment:	IPCC default values shall be used only when country or project specific data are not available or difficult to obtain, according to "Guidance on IPCC default values" (Extract of the report of the twenty-fifth meeting of the Executive Board, paragraph 59). Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits income for this project activity, whichever occurs later

Data Unit / Parameter:	$\boldsymbol{\rho}_{\mathbf{shaleoil}}$
Data unit:	tonne/L

Description:	Specific gravity of the shale oil
Source of data:	Value provided by the fuel provider through the technical form of the shale oil.
Value applied:	0.00097
Purpose of the data:	This parameter was used to calculate baseline emissions from the use of shale oil, measured in liters, which would be used in the baseline scenario. This data was used to convert measured values to tonnes. It was used in the current monitoring to convert the amount of shale oil consumed in the *Rolandia* unity, which is purchased in liters.
Any comment:	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

Data Unit / Parameter:	$\rho_{renbiomass}$
Data unit:	Tonne / m^3
Description:	Specific gravity of renewable biomass
Source of data:	Value measured and recorded by the project proponent.
Value applied:	**Biomasses** / **Specific Gravity (tonne/m³)**: **Wood chips** 0.350; **Peanut shells** 0.117
Purpose of the data:	The amount of biomasses was monitored in accordance to the weight or volume described in the receipts from the providers. Where the values in the receipts are described in m³, it is necessary the conversion to tonnes through the specific gravity of each biomass.
Any comment:	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

Data Unit / Parameter:	**Efficiency Factor**
Data unit:	Tonne of shale oil per tonne of steam.
Description:	Efficiency of the boiler, used for determining the amount of shale oil

	consumed, based on the amount of steam generated
Source of data:	This value was calculated through historical steam generation data and shale oil consumption registries provided by *Dori Alimentos LTDA*. According to the historical data, the average amount of steam generated is 13.5 kilogram for each kilogram of shale oil consumed. Thus, the efficiency of the boiler is 0.074074 tonne of shale oil per tonne of steam generated.
Value applied:	0.074
Purpose of the data:	Required to calculate the amount of shale oil generated by the amount of steam calculated with the steam flow meter.
Any comment:	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

Data Unit / Parameter:	**$COEF_{i,y}$**
Data unit:	tCO_2e/ tonne of fossil fuel
Description:	CO_2 emission coefficient of the shale oil
Source of data:	Value calculated through the parameters $NCV_{shaleoil}$ and $EF_{shaleoil}$: $COEF_{i,y} = NCV_{shaleoil} * EF_{shaleoil} = 31.8$ (GJ/tonne) * 0.0733 (tCO_2e/GJ) = 2.33094 (tCO_2e/tonne)
Value applied:	2.33094
Purpose of the data:	Required by the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion"[6] (version 02, EB 41, Annex 11) to calculate the project emissions (CO_2 emissions from the consumption of shale oil in the project activity).
Any comment:	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

Data Unit / Parameter:	**η_{th}**
Data unit:	%

[6] Document available at: http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v2.pdf. Last visited on 13/07/2012.

Description:	The efficiency of the plant using fossil fuel that would have been used in the absence of the project activity.
Source of data:	Value provided by the project proponent
Value applied:	100 %
Purpose of the data:	*Dori's* facilities do not monitor the energy generated by the shale oil consumed. However, it is well known the amount of shale oil consumed as well as the amount of fuel required to generate one tonne of steam. Therefore, this project will estimate the baseline emissions through the energy generated by the real consumption of fossil fuel and assuming that η_{th} is 100%.
Any comment:	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

3.2 Data and Parameters Monitored

Data Unit / Parameter:	**$Q_{renbiomass}$**
Data unit:	Tonnes
Description:	Amount of renewable biomass (per year)
Source of data:	Values measured and supplied by the project proponent
Description of measurement methods and procedures to be applied:	As predicted in the VCS PD, the amount of renewable biomass would be monitored in accordance to the weight described in the receipts from the providers and the number of trucks which arrives in the companies. However, during the current monitoring period, $Q_{renbiomass}$ was monitored by an internal control. Rolândia plant monitors the amount of renewable biomass utilized in the boiler according to the truck machine that transports biomass from the stocking area. Marília plant controls the amount of renewable biomass according to the number of storage bags.
Frequency of monitoring/recording:	Monthly
Value monitored:	

Period	**$Q_{renbiomass}$**	
	Wood chips consume (tonnes)	**Peanut shells consume (tonnes)**

	<table><tr><th></th><th>Marília</th><th>Rolandia</th><th>Marília</th><th>Rolandia</th></tr><tr><td>2008</td><td>1.736,00</td><td>2.397,68</td><td>314,50</td><td>0,00</td></tr><tr><td>2009</td><td>6.339,90</td><td>14.080,85</td><td>6.146,95</td><td>0,00</td></tr><tr><td>2010</td><td>4.777,50</td><td>12.464,83</td><td>7.057,21</td><td>0,00</td></tr><tr><td>2011</td><td>8.960,70</td><td>10.880,59</td><td>5.309,69</td><td>0,00</td></tr><tr><td>2012</td><td>8.652,35</td><td>11.907,84</td><td>6.241,72</td><td>0,00</td></tr><tr><td>2013</td><td>4.669,70</td><td>3.851,82</td><td>1.386,45</td><td>0,00</td></tr><tr><td>TOTAL</td><td>35.136,15</td><td>55.583,61</td><td>26.456,51</td><td>0,00</td></tr><tr><td>Total - Project Activity</td><td colspan="2">90.719,76</td><td colspan="2">26.456,51</td></tr></table> More detailed information, please see section 5.
Monitoring equipment:	*Dori's* units have a weight machine responsible for measurement of biomass purchased. The amount of renewable biomasses was monitored in accordance to *Dori's* internal control spreadsheet. Data regarding renewable biomass were organized by month.
QA/QC procedures to be applied:	The weighing-machine was calibrated periodically according to the INMETRO[7] procedures and parameters, in order to guarantee the quality and precision of the amount of biomass weighted.
Calculation method:	Not applicable
Any comment:	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

Data Unit / Parameter:	**HG_y**
Data unit:	TJ
Description:	Amount of heat supplied (per year)
Source of data:	The amount of steam generated (Q_{steam} - tonnes) is measured by the project developer (Dori Alimentos) and converted in TJ through the equation:

[7] INMETRO – Instituto Nacional de Metrologia, Normalização e Qualidade Industrial (National INstitute for metrology, normalization and indesrial quality) is a federal institution, responsible for verifiying calibration and quality procedures in Brazil.

<table>
<tr><td></td><td>HG_y (TJ) = $Q_{shaleoil}$ (tonnes) * $NCV_{shaleoil}$ (TJ/ton)</td></tr>
<tr><td>Description of measurement methods and procedures to be applied:</td><td>The amount of heat supplied was calculated based on the amount of shale oil that would be consumed in the baseline scenario and the energy generated by it, through the Net Calorific Value of shale oil.</td></tr>
<tr><td>Frequency of monitoring/recording:</td><td>Monthly</td></tr>
<tr><td>Value monitored:</td><td>
<table>
<tr><th rowspan="2">Period</th><th colspan="2">HG_y - Amount of heat supplied (TJ)</th></tr>
<tr><th>Marília</th><th>Rolandia</th></tr>
<tr><td>2008</td><td>20,93</td><td>23,57</td></tr>
<tr><td>2009</td><td>140,67</td><td>141,44</td></tr>
<tr><td>2010</td><td>141,41</td><td>141,44</td></tr>
<tr><td>2011</td><td>132,53</td><td>141,44</td></tr>
<tr><td>2012</td><td>128,30</td><td>141,44</td></tr>
<tr><td>2013</td><td>44,34</td><td>47,15</td></tr>
<tr><td>TOTAL</td><td>608,18</td><td>636,46</td></tr>
<tr><td>Total - Project Activity</td><td colspan="2">1.244,64</td></tr>
</table>
More detailed information, please see section 5.
</td></tr>
<tr><td>Monitoring equipment:</td><td>No monitoring equipment was used to determine this parameter.</td></tr>
<tr><td>QA/QC procedures to be applied:</td><td>Not applied</td></tr>
<tr><td>Calculation method:</td><td>The amount of heat supplied was calculated through the equation:

HG_y (TJ) = $Q_{shaleoil}$ (tonnes) * $NCV_{shaleoil}$ (TJ/tonne)</td></tr>
<tr><td>Any comment:</td><td>Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.</td></tr>
</table>

<table>
<tr><td>Data Unit / Parameter:</td><td>$Q_{shaleoil}$</td></tr>
<tr><td>Data unit:</td><td>Tonnes</td></tr>
<tr><td>Description:</td><td>Amount of shale oil that would be consumed in the baseline scenario</td></tr>
<tr><td>Source of data:</td><td>Calculated based on the amount of steam generated by boilers of Dori's units and an Efficiency Factor determinated by historical data.</td></tr>
<tr><td>Description of measurement methods and procedures to be applied:</td><td>The amount of shale oil that would be consumed was calculated through the amount of steam generated, which is measured monthly by the project proponent, and an Efficiency Factor. The Efficiency Factor was determined through historical stem generation data and shale oil consumption registries according to the baseline scenario.</td></tr>
<tr><td>Frequency of monitoring/recording:</td><td>Monthly</td></tr>
<tr><td>Value monitored:</td><td>
<table>
<tr><th rowspan="2">Period</th><th colspan="2">$Q_{shaleoil}$ - Amount of shale oil that would be consumed in the baseline scenario (tonnes)</th></tr>
<tr><th>Marília</th><th>Rolandia</th></tr>
<tr><td>2008</td><td>549,45</td><td>618,70</td></tr>
<tr><td>2009</td><td>3.692,03</td><td>3.712,21</td></tr>
<tr><td>2010</td><td>3.711,62</td><td>3.712,21</td></tr>
<tr><td>2011</td><td>3.478,51</td><td>3.712,21</td></tr>
<tr><td>2012</td><td>3.367,34</td><td>3.712,21</td></tr>
<tr><td>2013</td><td>1.163,75</td><td>1.237,40</td></tr>
<tr><td>TOTAL</td><td>15.962,71</td><td>16.704,96</td></tr>
<tr><td>Total - Project Activity</td><td colspan="2">32.667,67</td></tr>
</table>
More detailed information, please see section 5.
</td></tr>
<tr><td>Monitoring equipment:</td><td>No monitoring equipment was used to determine this parameter.</td></tr>
<tr><td>QA/QC procedures to be applied:</td><td>The project developer was responsible for gathering and maintaining in adequate archives all data from steam production (measured by flow meter daily).</td></tr>
<tr><td>Calculation method:</td><td>The amount of shale oil that would be consumed in the baseline scenario was calculated through the equation:

$Q_{shaleoil} = Q_{steam}$ (tonnes of steam)* Efficiency Factor (tonnes of shale oil/tonne of steam)</td></tr>
</table>

Any comment:	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

Data Unit / Parameter:	Q_{steam}
Data unit:	Tonnes
Description:	Amount of steam generated by the boiler
Source of data:	Value measured daily by the project proponent (*Dori Alimentos*).
Description of measurement methods and procedures to be applied:	As described in the VCS PD, the amount of steam generated would be measured monthly by a flow meter installed in the boiler by the project proponent and registered in electronic format (Excel spreadsheets).
Frequency of monitoring/recording:	Monthly
Value monitored:	
Monitoring equipment:	Flow meter equipment, installed in the boiler, was used to determine this parameter. A flow meter equipment was installed at *Marília's* unit and *Rolândia's* unit, both are specified as SMAR LD301, technology developed by HART®.
QA/QC procedures to be applied:	The project developer was responsible for gathering and maintaining in adequate archive all data from steam generation (measured by flow meter daily) and also for controlling the flow meter calibration (according to the INMETRO requirements).

Period	**Q_{steam} - Amount of steam generated by the boiler (tonnes)**	
	Marília	**Rolandia**
2008	7.425,00	8.360,84
2009	49.892,30	50.165,05
2010	50.157,08	50.165,05
2011	47.006,95	50.165,05
2012	45.504,63	50.165,05
2013	15.726,30	16.721,68
TOTAL	**215.712,26**	**225.742,73**
Total - Project Activity	**441.455,00**	

More detailed information, please see section 5.

Calculation method:	Not applied
Any comment:	During the current monitoring period, in Rolândia Plant there was not a flow meter installed in the steam pipe of the boilers. Therefore, the parameter Q_{steam} had to be recalculated. Firstly, to calculate the amount of shale oil that would have been consumed per month (in tonnes/month), the total energy provided by the shale oil and renewable biomass that were actually consumed at each month of the current monitoring period was divided by the NCV of the shale oil. Then, dividing this value by the efficiency factor of the boiler (0.074 tonne of shale oil per tonne of steam), the monthly estimate of the amount of steam generated could be obtained. In addition, as a conservative measure, among all the monthly Q_{steam} values, the lowest one was selected and therefore applied to each month of the current monitoring period. More detailed information can be seen in the VCS Calculation spreadsheet. The Marilia plant only measured the steam produced by the renewable biomass boiler. Thus, in order to be conservative, the BE_y (baseline emissions from steam/heat displaced by the project activity during the year y) was calculated utilizing only the amount of steam provided by the renewable biomass boiler, thus not considering the steam produced by the shale oil boiler. Furthermore, the flow meter installed in the renewable biomass boiler was not calibrated. Hence, a correction factor of 5% was applied in the amount of steam measured in the period. The correction factor applied follows UNFCCC rules, available at "Guidelines for Assessing Compliance With The Calibration Frequency Requirements"[8]. Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

Data Unit / Parameter:	**Renewable Biomass origin**
Data unit:	Not applicable
Description:	Origin of renewable biomass
Source of data:	Documents proving that the biomass is renewable.
Description of measurement methods and	The documentation from renewable biomass providers was provided to prove the renewable origin of the biomass.

[8] Document available at: http://cdm.unfccc.int/Reference/Guidclarif/iss/iss_guid05.pdf. Last visited on: 16/08/2013.

procedures to be applied:	
Frequency of monitoring/recording:	Each crediting period
Value monitored:	Not directly applied for the calculation. It was considered that all biomass used are renewable.
Monitoring equipment:	No monitoring equipment was used to determine this parameter.
QA/QC procedures to be applied:	The biomasses were considered renewable as they were in accordance with the definition given by the Annex 18, EB 23 of UNFCCC definition.
Calculation method:	Not applicable
Any comment:	All the renewable biomasses utilized in the monitoring period were already described in the project design document. Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

Data Unit / Parameter:	**Leakage of non-renewable biomass**
Data unit:	tCO_2e
Description:	Leakage resulted from the implantation of the project activity
Source of data:	Estimated
Description of measurement methods and procedures to be applied:	The leakage considered in this project activity is regarding the the General guidance on leakage in biomass project activities (Annex 28, EB 47)[9],, which are in consistency with the other biomass alternatives available in the project activity region (forest residues and peanut shells).
Frequency of monitoring/recording:	Annually
Value monitored:	0
Monitoring equipment:	No monitoring equipment was used to determine this parameter.
QA/QC procedures to be applied:	Information about the biomass availability in the region will be monitored to check the occurrence of leakage.

[9] UNFCCC. General guidance on leakage in biomass project activities - Version 03. Available at: <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved/history/c_leak_biomass/guid_biomass_v03.pdf> . Last visited on 14/08/2012.

Calculation method:	Not applicable.
Any comment:	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

Data Unit / Parameter:	**FC $_{i,j,y}$**
Data unit:	Tonnes per year
Description:	Amount of fossil fuel combusted in the project activity
Source of data:	Amount of shale oil consumed is monitored by the project proponent
Description of measurement methods and procedures to be applied:	The amount of shale oil consumed was measured monthly through level marks in the fuel tank. Also the total amount of fuel purchased was registered through receipt registries archived in Dori´s units. The measurement is registered in kg at *Marília's* unit, and in liter at *Rolândia's* unit. .
Frequency of monitoring/recording:	Annually
Value monitored:	

Period	**FC $_{i,j,y}$ - Total of shale oil consumed (tonnes)**	
	Marília	**Rolandia**
2008	33,54	6,35
2009	188,24	119,36
2010	299,62	62,17
2011	254,99	264,91
2012	194,23	115,87
2013	73,22	94,13
TOTAL	**1.043,84**	**662,80**
Total - Project Activity	**1.706,64**	

Monitoring equipment:	No monitoring equipment was used to determine this parameter. This parameter was measured according to level marks in the fuel tank.
QA/QC procedures to be applied:	The project developer was responsible for gathering and maintaining in adequate archives all documents related to the shale oil consumption and purchase.
Calculation method:	Not applicable.
Any comment:	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

3.3 Description of the Monitoring Plan

The monitoring is done with the aim of determining the most approximate quantity of shale oil that, in the absence of the project, would be used in the *Dori*'s boilers and consequently the amount of GHG that would be emitted in tonnes of CO_2e. Section 3.2 describes data and parameters monitored, as well as the procedures involved on the monitoring plan.

Dori Alimentos personnel are responsible to monitor the operating conditions at head office and subsidiary unity, including the amount of renewable biomass consumed, amount of steam and heat generated by the boiler and amount of fossil fuel combusted. They are also responsible to store invoices, receipts of sales and other documents related to purchase or acquisition of biomass.

Based on this information, Sustainable Carbon is responsible to assess if the biomasses are from renewable origin, to evaluate if there is a surplus of renewable biomass and to calculate emission reductions, including an assessment of leakage emissions.

Sustainable Carbon assists the Dori' personnel to double check the monitored data on biomass, steam generated by the boiler and fossil fuel combusted. However, no internal auditing was performed on data related to this monitoring period. Non-conformities identified in the double check procedures are clarified between Sustainable Carbon technical team and the monitoring responsible on each unity.

The responsible for the monitoring plan is *Mrs. Márcia S. Cavicchioli* from Dori's head office unity. Sustainable Carbon technical team (including those members described on Section 1.3) was also involved in the project monitoring.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

Baseline emissions are estimated following procedures of the applied methodology: Category AMS-I.C: Thermal energy for the user with or without electricity – Version 13 (Valid from March 28th, 2008 to April 07th, 2009)[10].This category comprises renewable energy technologies that supply individual households or users with thermal energy that displaces fossil fuels. The project activity encompasses the use of two boilers at each *Dori's* unit, one boiler uses biomass and another uses shale oil as fuel.

In this monitoring period that encompasses 54 months, the project generated 405.24 TJ per year. Converting this number to MWh, it was generated 112,565.85 MWh per year, which corresponds to the use of 12.85 MWthermal that is less than the limits of 45 MWthermal for Type I Small Scale project activities.

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Baseline emissions

$$BE_y = HG_y * EF_{CO2} / \eta_{th} \qquad \text{(Equation 01)}$$

[10] This version of the methodology is available at: <http://cdm.unfccc.int/filestorage/C/D/M/CDMWF_AM_YL0327DQSKVFXYQREWRT3VNR58402G/EB38_repan09_AMS_I.C_ver13.pdf?t=TnR8bTczejljfDC4vzmRYQSGKJUoZqKvjYzW>. Last visited on 12/07/2012.

Where:

BE_y: The baseline emissions from steam/heat displaced by the project activity during the year y in tCO_2e.

HG_y: The net quantity of heat supplied by the project activity during the year y in TJ.

EF_{CO2}: The CO_2 emission factor per unit of energy of the fuel that was used in the baseline plant in (tCO_2 / TJ), obtained from IPCC default emission factors[11].

η_{th}: The efficiency of the plant using fossil fuel that would have been used in the absence of the project activity.

$$HG_y = Q_{shaleoil} \times NCV_{shaleoil} \quad \textbf{(Equation 02)}$$

Where:

$Q_{shaleoil}$: Amount of shale oil consumed (tonne)

$NCV_{shaleoil}$: Net calorific value of shale oil (TJ/tonne)

4.2 Project Emissions

The project emissions are those related to the CO_2 emissions from the consumption of shale oil and are calculated according to the second version of the methodological tool "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" (EB 41, annex 11)[12]. The shale oil consumption in the project activity is considered a minor emission source, once the small amount of fossil fuel consumption is required only during cleaning and maintenance of the steam generation equipments.

The project emissions (PE_y) are calculated through equation 03:

$$PE_y = FC_{i,j,y} * COEF_{i,y} \quad \textbf{(Equation 03)}$$

Where:

PE_y: Project CO_2 emissions from the combustion of fossil fuel (tCO_2e)

$FC_{i,j,y}$: Amount of fossil fuel combusted in year y (tonnes of fossil fuel)

$COEF_{i,y}$: CO_2 emission coefficient of the fossil fuel used in year y (tCO_2e/ tonne of fossil fuel)

The parameter $COEF_{i,y}$ value is 2.33094 tCO_2e/tonne and was calculated as per the following equation, required in the methodological tool (EB 41, annex 11):

[11] Emission factor of shale oil, according to Intergovernmental Panel on Climate Change (IPCC). Available at: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf. Last visited on 13/07/2012.

[12] Document available at: http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v2.pdf. Last visited on 13/07/2012.

$$COEF_{i,y} = NCV_{i,j} * EF_{CO2i,j} \quad \textbf{(Equation 04)}$$

Where:

$COEF_{i,y}$: CO_2 emission coefficient of the shale oil used in year y (tCO_2e/tone of fossil fuel)

$NCV_{i,j}$: Weighted average net calorific value of shale oil (GJ/ tonne)

$EF_{CO2i,j}$: Weighted average CO_2 emission factor of shale oil (tonnes of CO_2e/ GJ)

Emission Reductions

As the project activity consumes a small amount of shale oil, the emission reductions calculations were made deducing the amount of thermal energy generated by the shale oil consumption, so that the final results represent only the amount of emission reductions generated by the consumption of renewable biomasses:

$$ER_y = BE_y - LE_y - PE_y \quad \textbf{(Equation 05)}$$

Where:

ER_y: Emission reduction in the year "y" (tCO_2e)

BE_y: Baseline emissions of CO_2 that would be generated through shale oil burning (tCO_2e)

LE_y: Leakage emissions from renewable biomass (tCO_2e)

PE_y: Project CO_2 emissions from the combustion of shale oil (tCO_2e)

4.3 Leakage

The leakage predicted in the baseline and monitoring methodology AMS-I.C - Thermal energy for the user with or without electricity (version 13, EB 38) is not applicable for this project activity as there is no transference of equipment.

The leakage from biomass projects, like the project activity, shall also be estimated according to the "General guidance on leakage in biomass project activities (Annex 28, EB 47)[13]" of Indicative Simplified Baseline and Monitoring Methodologies for Selected Small-Scale CDM Project Activity Categories, which identifies different emission sources based on type of biomass being considered. Table below identifies the sources of leakage applicable to each type of biomass.

[13] UNFCCC. General guidance on leakage in biomass project activities - Version 03. Available at: <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved/history/c_leak_biomass/guid_biomass_v03.pdf> . Last visited on 14/08/2012.

Table 01. Sources of leakage according to the type of the biomass used

Biomass Type	Activity/ Source	Shift of pre project activities	Emissions from biomass generation/ cultivation	Competing use of biomass
Biomass from forests	Existing forests	-	-	X
	New forests	X	X	-
Biomass from croplands or grasslands (woody or non-woody)	In the absence of the project the land would be used as a cropland/wetland	X	X	-
	In the absence of the project the land will be abandoned	-	X	-
Biomass residues or waste	Biomass residues or wastes are collected and used.	-	-	X

Observing table above, the source of leakage of the present project is showed below according to each type of biomass applied to the *Dori*'s units.

Forest Residues (Sawdust/wood chips)

Forest Residues are used for steam generation in both production units of the project activity. The production of wood generates a large amount of residues, which can be reused to generate thermal energy. As can be observed in the figure 2, the potential of energy generation in the states of *São Paulo* and *Paraná* are extremely high, which means there is an enormous availability of this kind of fuel to be employed in the production units (*Rolândia – Paraná* and *Marília - São Paulo*).

During the current monitoring period, the average amount of wood chips consumed yearly by the project activity was 57,599.84 m^3. This value represented around 0.18% of the total of woody residues produced in the region. Therefore, the project activity did not disturb in any aspects this renewable fuel market once there is plenty of this kind of biomass available.

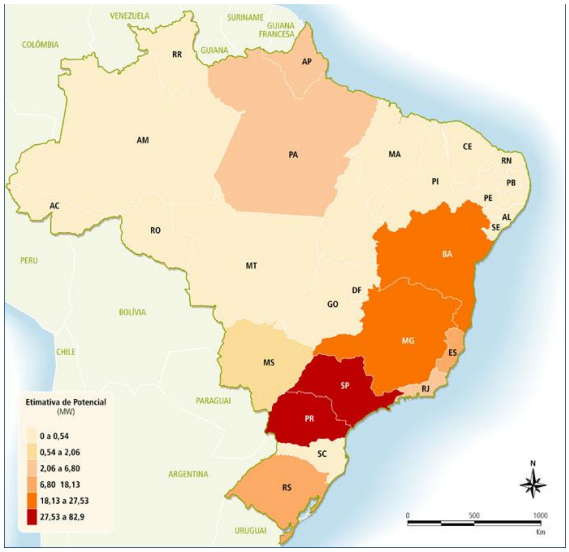

Figure 2. Forest Residues Potential for Energy Generation[14].

Table 02. Production of wood residues in the States of *São Paulo* and *Paraná.*

	São Paulo	Paraná
Production of wood log - 2007 (m^3)	*25,966,464*[15]	*23,759,668*[16]
Amount of wood chips produced per m3 of wood log (%)[17]	65	
Total residues generated (m^3)	16,878,202	15,443,784
Average amount of wood chips consumed by the project activities (m^3/ year)	57,599.84	

[14] Source: *CENTRO NACIONAL DE REFERÊNCIA EM BIOMASSA - CENBIO. Panorama do potencial de biomassa no Brasil. Brasília*; Dupligráfica, 2003. 80p. – Map available at: <http://www.aneel.gov.br/aplicacoes/Atlas/biomassa/5_2.htm>. Last visited on 13/07/2012.

[15] According to IBGE (Geographic and Statistic Brazilian Institute) Available at: http://www.sidra.ibge.gov.br/bda/silvi/default.asp?t=2&z=t&o=29&u1=1&u3=1&u4=1&u2=31. Last visited on 13/07/2012.

[16] According to IBGE (Geographic and Statistic Brazilian Institute) Available at: http://www.sidra.ibge.gov.br/bda/silvi/default.asp?t=2&z=t&o=29&u1=1&u3=1&u4=1&u2=32. Last visited on 13/07/2012.

[17] According to Brand (et. al 1999), 65% of all forestry produced yearly becomes waste biomass - BRAND, M.A; MUNIZ, G.I.B.; SILVA, D.A.; KLOCK. U. Caracterização do rendimento e quantificação dos resíduos gerados em serrarias através do balanço de materiais. Revista Floresta 32(2) 247-259. Paraná, 2001 (Characterization of the income and measurement of the waste generated in sawmills through the material balance. "Floresta" Magazine 32(2).

Peanut Shell

Peanut Shell is used in Dori's *Marília* unit. The state of *São Paulo* is the biggest producer of peanut of Brazil. Table 03 shows the total amount of peanut produced between the years 2005 and 2007 in the state of *São Paulo* and Brazil. According to CENBIO the shell represents 30 % of peanut's weight[18].

Table 03. Peanut Production in the state of *São Paulo*

Peanut production in *São Paulo* State		
Harvest	2005/2006	2006/2007
Peanut production (in thousand of tonnes)[19]	207.8	188.3
Peanut shells (in thousand of tonnes)	62.34	56.49
Average amount of peanut shells consumed by the project activities tonnes/year)	5,879.22	

As the peanut shells used in *Dori Alimentos* head office are a residue of the peanut production process, they are classified as a "biomass residue or waste". The average consumption of peanut shells by the project activity, during the current monitoring period, was 50,249.77 m³ per year or 5,879.22 tonnes, considering the specific gravity of peanut shell is 0.117 tonne/m³ (described on section 3.1). This value represented around 4.9% of the total of peanut shells produced in *São Paulo* State. Therefore, the project activity did not disturb in any aspects this renewable fuel market once there is plenty of this kind of biomass available.

C) If the equipment is transferred from another activity or if the existing equipment is transferred to another activity, leakage is to be considered.

The leakage is not applicable for this project activity as there was no transference of equipment, in spite of new equipments had to be acquired.

Due to all the explanations described above, the present project activity does not encompass any type of leakage.

[18] According to CENBIO (Nacional Biomass Reference Center) available at: <cenbio.iee.usp.br/download/metodologiabiomassa.pdf>. Last visited on 13/07/2012.

[19] According to MAPA (Brazilian Ministry of Agriculture, Livestock and Supplies) available at: <http://www.iica.org.br/Docs/Publicacoes/PublicacoesAgricolas/Lev03_Safra20062007.pdf>. Last visited on 13/07/2012.

4.4 Summary of GHG Emission Reductions and Removals

Table below summarizes the emission reductions for this monitoring period.

Table 04. Emission reductions for the monitoring period – Dori's Head Office - Marília, SP

Period		BEy - Baseline Emission (tCO2e)	PEy Project Emission (tCO2e)	ERy Emission Reduction (tCO2e)
2008	November	926	58	868
	December	608	36	572
	Total	**1.534**	**94**	**1.440**
2009	January	852	12	840
	February	710	26	684
	March	823	27	796
	April	864	30	834
	May	879	61	818
	June	837	44	793
	July	908	45	863
	August	937	38	899
	September	893	67	826
	October	889	26	863
	November	863	46	817
	December	850	104	746
	Total	**10.305**	**526**	**9.779**
2010	January	850	33	817
	February	727	47	680
	March	741	59	682
	April	698	48	650
	May	813	43	770
	June	795	40	755
	July	875	54	821
	August	882	42	840
	September	772	38	734
	October	880	104	776
	November	806	134	672
	December	1.520	196	1.324
	Total	**10.359**	**838**	**9.521**
2011	January	762	52	710
	February	751	63	688
	March	830	44	786
	April	801	67	734
	May	880	62	818
	June	802	70	732
	July	730	44	686

	August	906	44	862
	September	833	62	771
	October	881	107	774
	November	762	67	695
	December	769	30	739
	Total	**9.707**	**712**	**8.995**
2012	January	804	32	772
	February	614	10	604
	March	726	41	685
	April	791	21	770
	May	876	39	837
	June	797	93	704
	July	880	50	830
	August	899	73	826
	September	795	60	735
	October	899	25	874
	November	776	88	688
	December	541	11	530
	Total	**9.398**	**543**	**8.855**
2013	January	861	42	819
	February	756	60	696
	March	777	78	699
	April	854	25	829
	Total	**3.248**	**205**	**3.043**
Total Monitoring Period		**44.551**	**2.918**	**41.633**

Table 05. Emission reductions for the monitoring period – Dori's Subsidiary Unit – Rolândia, PR

Period		**BE_y - Baseline Emission (tCO_2e)**	**PE_y Project Emission (tCO_2e)**	**ER_y Emission Reduction (tCO2e)**
2008	November	863	0	863
	December	863	18	845
	Total	**1.726**	**18**	**1.708**
2009	January	863	0	863
	February	863	0	863
	March	863	36	827
	April	863	12	851
	May	863	16	847
	June	863	11	852
	July	863	27	836
	August	863	30	833
	September	863	15	848
	October	863	56	807
	November	863	62	801
	December	863	69	794

	Total	**10.356**	**334**	**10.022**
2010	January	863	16	847
	February	863	17	846
	March	863	11	852
	April	863	16	847
	May	863	5	858
	June	863	5	858
	July	863	19	844
	August	863	0	863
	September	863	12	851
	October	863	46	817
	November	863	9	854
	December	863	17	846
	Total	**10.356**	**173**	**10.183**
2011	January	863	65	798
	February	863	82	781
	March	863	116	747
	April	863	75	788
	May	863	98	765
	June	863	22	841
	July	863	67	796
	August	863	14	849
	September	863	19	844
	October	863	57	806
	November	863	60	803
	December	863	65	798
	Total	**10.356**	**740**	**9.616**
2012	January	863	17	846
	February	863	25	838
	March	863	10	853
	April	863	6	857
	May	863	10	853
	June	863	65	798
	July	863	33	830
	August	863	81	782
	September	863	11	852
	October	863	13	850
	November	863	9	854
	December	863	42	821
	Total	**10.356**	**322**	**10.034**
2013	January	863	33	830
	February	863	66	797
	March	863	33	830
	April	863	130	733
	Total	**3.452**	**262**	**3.190**
Total Monitoring Period		**46.602**	**1.849**	**44.753**

Table 06. Total Emission Reductions for the monitoring period

Period	BE_y - Baseline Emission (tCO_2e)		PE_y Project Emission (tCO_2e)		Total Emission Reductions (tCO_2e)	
	Marília	**Rolandia**	**Marília**	**Rolandia**	**Marília**	**Rolandia**
2008	1.534	1.726	94	18	1.440	1.708
2009	10.305	10.356	526	334	9.779	10.022
2010	10.359	10.356	838	173	9.521	10.183
2011	9.707	10.356	712	740	8.995	9.616
2012	9.398	10.356	543	322	8.855	10.034
2013	3.248	3.452	205	262	3.043	3.190
TOTAL	**44.551**	**46.602**	**2.918**	**1.849**	**41.633**	**44.753**
Total - Project Activity	**91.153**		**4.767**		**86.386**	

5 ADDITIONAL INFORMATION

Table 07. Monitored parameters of Dori's Head Office – Marília SP

Period		$FC_{i,i,y}$ - Total of shale oil consumed by the project activity	Q_{steam} - Amount of steam generated by the boiler	$Q_{renbiomass}$ - Total of renewable biomass consumed by the project activity		$Q_{shaleoil}$ - Amount of shale oil that would be consumed in the baseline scenario	HG_y - Amount of heat supplied
		Tonnes	Tonnes - Corrected Values	wood chips (tonnes)	peanut shells (tonnes)	Tonnes	TJ
2008	November	20,64	4.480,81	1.066	195	331,58	12,63
	December	12,90	2.944,19	670	120	217,87	8,30
	Total	**33,54**	**7.425,00**	**1.736**	**314**	**549**	**20,93**
2009	January	4,13	4.122,74	1.120	146	305,08	11,62
	February	9,48	3.437,08	630	307	254,34	9,69
	March	9,80	3.982,74	514	416	294,72	11,23
	April	10,84	4.184,07	470	397	309,62	11,80
	May	21,74	4.256,44	377	452	314,98	12,00
	June	15,58	4.053,04	20	616	299,92	11,43
	July	16,06	4.397,42	0	693	325,41	12,40
	August	13,64	4.534,53	63	682	335,56	12,78
	September	24,12	4.325,89	434	460	320,12	12,20
	October	9,29	4.304,82	47	735	318,56	12,14
	November	16,44	4.178,94	2.224	750	309,24	11,78
	December	37,12	4.114,59	442	493	304,48	11,60
	Total	**188,24**	**49.892,30**	**6.340**	**6.147**	**3.692**	**140,67**
2010	January	11,67	4.114,99	70	726	304,51	11,60
	February	16,88	3.519,66	215	514	260,45	9,92
	March	21,16	3.586,85	146	658	265,43	10,11
	April	17,31	3.380,75	108	675	250,18	9,53
	May	15,27	3.935,94	122	803	291,26	11,10
	June	14,43	3.847,29	410	642	284,70	10,85
	July	19,26	4.237,96	865	491	313,61	11,95
	August	15,06	4.271,52	434	692	316,09	12,04

	September	13,45	3.738,82	434	560	276,67	10,54
	October	37,13	4.261,89	221	654	315,38	12,02
	November	47,85	3.904,48	428	574	288,93	11,01
	December	70,16	7.356,93	1.324	68	544,41	20,74
	Total	**299,62**	**50.157,08**	**4.778**	**7.057**	**3.712**	**141,41**
2011	January	18,56	3.690,75	1.636	0	273,12	10,41
	February	22,41	3.638,50	1.581	0	269,25	10,26
	March	15,68	4.017,55	1.242	308	297,30	11,33
	April	24,00	3.879,80	453	556	287,11	10,94
	May	22,02	4.262,65	509	617	315,44	12,02
	June	25,20	3.885,50	435	594	287,53	10,95
	July	15,93	3.534,95	366	530	261,59	9,97
	August	15,80	4.385,20	533	575	324,50	12,36
	September	22,21	4.032,75	441	564	298,42	11,37
	October	38,48	4.266,45	1.011	339	315,72	12,03
	November	23,86	3.688,85	386	604	272,97	10,40
	December	10,84	3.724,00	368	622	275,58	10,50
	Total	**254,99**	**47.006,95**	**8.960,70**	**5.309,69**	**3.478,51**	**132,53**
2012	January	11,38	3.891,20	939	418	287,95	10,97
	February	3,61	2.975,40	1.234	93	220,18	8,39
	March	14,80	3.514,05	587	480	260,04	9,91
	April	7,53	3.831,93	329	727	283,56	10,80
	May	13,97	4.239,85	127	1.005	313,75	11,95
	June	33,23	3.860,80	462	742	285,70	10,89
	July	17,88	4.262,65	274	883	315,44	12,02
	August	26,15	4.351,00	22	1.014	321,97	12,27
	September	21,40	3.848,45	901	383	284,79	10,85
	October	8,80	4.352,90	1.430	216	322,11	12,27
	November	31,49	3.757,25	1.404	158	278,04	10,59
	December	4,00	2.619,15	944	125	193,82	7,38
	Total	**194,23**	**45.504,63**	**8.652**	**6.242**	**3.367**	**128,30**
2013	January	15,10	4.169,55	977	546	308,55	11,76
	February	21,52	3.659,40	651	558	270,80	10,32
	March	27,80	3.763,90	1.504	149	278,53	10,61
	April	8,80	4.133,45	1.537	133	305,88	11,65

	Total	**73,22**	**15.726,30**	**4.670**	**1.386**	**1.164**	**44**
Total Monitoring Period		**1.043,84**	**215.712,26**	**35.136**	**26.457**	**15.963**	**608**

Table 08. Monitored parameters of Dori's Subsidiary Unit – Rolândia PR

Period		**$FC_{i,j,y}$ - Total of shale oil consumed by the project activity**	**Q_{steam} - Amount of steam - Monitoring Period**	**$Q_{renbiomass}$ - Total of renewable biomass consumed by the project activity**	**$Q_{shaleoil}$ - Amount of shale oil that would be consumed in the baseline scenario**	**HG_y . Amount of heat supplied**
		Tonnes	**Tonnes**	**wood chips (tonnes)**	**Tonnes**	**TJ**
2008	November	0,00	4.180,42	1.351	309,35	11,79
	December	6,35	4.180,42	1.047	309,35	11,79
	Total	**6,35**	**8.360,84**	**2.398**	**619**	**23,57**
2009	January	0,00	4.180,42	1.082	309,35	11,79
	February	0,00	4.180,42	1.109	309,35	11,79
	March	12,95	4.180,42	1.294	309,35	11,79
	April	4,42	4.180,42	1.090	309,35	11,79
	May	5,66	4.180,42	1.109	309,35	11,79
	June	3,78	4.180,42	1.230	309,35	11,79
	July	9,51	4.180,42	1.553	309,35	11,79
	August	10,76	4.180,42	1.303	309,35	11,79
	September	5,46	4.180,42	1.135	309,35	11,79
	October	20,06	4.180,42	1.116	309,35	11,79
	November	22,20	4.180,42	1.182	309,35	11,79
	December	24,56	4.180,42	878	309,35	11,79
	Total	**119,36**	**50.165,05**	**14.081**	**3.712**	**141,44**
2010	January	5,78	4.180,42	1.187	309,35	11,79
	February	6,19	4.180,42	1.181	309,35	11,79
	March	3,81	4.180,42	1.395	309,35	11,79
	April	5,86	4.180,42	1.067	309,35	11,79
	May	1,74	4.180,42	1.054	309,35	11,79
	June	1,79	4.180,42	866	309,35	11,79
	July	6,87	4.180,42	981	309,35	11,79
	August	0,00	4.180,42	1.048	309,35	11,79

	September	4,28	4.180,42	1.020	309,35	11,79
	October	16,48	4.180,42	833	309,35	11,79
	November	3,24	4.180,42	885	309,35	11,79
	December	6,15	4.180,42	948	309,35	11,79
	Total	**62,17**	**50.165,05**	**12.465**	**3.712**	**141,44**
2011	January	23,23	4.180,42	829	309,35	11,79
	February	29,21	4.180,42	684	309,35	11,79
	March	41,65	4.180,42	662	309,35	11,79
	April	26,69	4.180,42	699	309,35	11,79
	May	35,24	4.180,42	978	309,35	11,79
	June	7,82	4.180,42	981	309,35	11,79
	July	24,04	4.180,42	1.011	309,35	11,79
	August	4,99	4.180,42	1.247	309,35	11,79
	September	6,68	4.180,42	1.077	309,35	11,79
	October	20,59	4.180,42	1.021	309,35	11,79
	November	21,63	4.180,42	964	309,35	11,79
	December	23,14	4.180,42	727	309,35	11,79
	Total	**264,91**	**50.165,05**	**10.881**	**3.712**	**141,44**
2012	January	6,20	4.180,42	822	309,35	11,79
	February	9,00	4.180,42	904	309,35	11,79
	March	3,46	4.180,42	1.100	309,35	11,79
	April	2,32	4.180,42	932	309,35	11,79
	May	3,67	4.180,42	1.108	309,35	11,79
	June	23,28	4.180,42	997	309,35	11,79
	July	11,92	4.180,42	1.126	309,35	11,79
	August	28,98	4.180,42	1.021	309,35	11,79
	September	3,99	4.180,42	1.024	309,35	11,79
	October	4,72	4.180,42	1.068	309,35	11,79
	November	3,34	4.180,42	1.042	309,35	11,79
	December	14,98	4.180,42	763	309,35	11,79
	Total	**115,87**	**50.165,05**	**11.908**	**3.712**	**141,44**
2013	January	11,98	4.180,42	1.018	309,35	11,79
	February	23,78	4.180,42	849	309,35	11,79
	March	11,71	4.180,42	1.092	309,35	11,79
	April	46,66	4.180,42	893	309,35	11,79

	Total	**94,13**	**16.721,68**	**3.852**	**1.237**	**47,15**
Total Monitoring Period		**662,80**	**225.742,73**	**55.584**	**16.705**	**636,46**