

Clean Development Mechanism South Africa
Designated National Authority



energy

Department:
Energy
REPUBLIC OF SOUTH AFRICA

Private Bag X 19 , Acardia ,Pretoria, 0007, Tel:012-444 4116, Fax: 012 341 5133
Private Bag X9111, Cape Town, 8000, Tel: 021-469 6412, Fax: 021-465 5980

Project Design Document (PDD)

Project reference number (office)	
Date received (office use only)	

NOTES ON COMPLETING THIS PROJECT DESIGN DOCUMENT

1. Please provide this PDD in both hard-copy

Part A: Project Proponent Details

Project Name	PoA title: Biomass Energy Generation through Gasification or Direct Combustion in South Africa CPA1 title: FSCGC001 – Under the PoA “Biomass Energy Generation through Gasification or Direct Combustion in South Africa”
Date of Submission of PDD	21 September 2012

Project Developer	
Name	Farmsecure Carbon (Pty) Ltd
Organizational Category	Private Company
Legal Status	Limited Company
Street Address	350 Farm Wonderfontein Minaar Street Sasolburg 1947
Postal Address (if different from above)	P.O.Box 1033 Vanderbijlpark 1900 RSA
Website Address	www.farmsecure.co.za

Main Activities	<p>Farmsecure Carbon (Pty) Ltd is a company within the Farmsecure Technologies group of businesses, which is majority owned by the Farmsecure Group of Companies. Farmsecure Group is a multi-billion South African Rand Group of businesses operating in Sub-Saharan Africa. We are involved in creating profitable and sustainable enterprises in agriculture and the agri-processing value chain.</p> <p>Farmsecure Carbon's core business is the identification, design, financing, implementation and operation of economically viable projects under the Clean Development Mechanism (CDM) and in the areas of renewable energy and carbon emission reduction.</p> <p>Farmsecure Carbon mainly focuses on the implementation of bio-mass to renewable energy, generation of carbon credits through greenhouse gas mitigation and the processing of by-products into fertiliser. We achieve this by delivering a full range of professional services that contributes towards sustainability and improved environmental management practices.</p>																								
Summary of Financial Performance in last fiscal year	<p>Farmsecure Carbon (Pty) Ltd is a wholly owned subsidiary of Farmsecure Technologies (Pty) Ltd, which is a division of the Farmsecure Group of Companies.</p> <p>Farmsecure Technologies financial summary</p> <table border="0"> <tr><td>Assets end Dec:</td><td>833m</td></tr> <tr><td>Non-current assets end Dec:</td><td>231m</td></tr> <tr><td>Equity:</td><td>89m</td></tr> <tr><td>Revenue:</td><td>1,851m</td></tr> <tr><td>Gross profit:</td><td>228m</td></tr> <tr><td>Net profit:</td><td>25m</td></tr> </table> <p>Farmsecure Group financial summary</p> <table border="0"> <tr><td>Assets end Dec:</td><td>3,896m</td></tr> <tr><td>Non-current assets end Dec:</td><td>1,165m</td></tr> <tr><td>Equity:</td><td>678m</td></tr> <tr><td>Revenue:</td><td>3,359m</td></tr> <tr><td>Gross profit:</td><td>207m</td></tr> <tr><td>Net profit:</td><td>272m</td></tr> </table>	Assets end Dec:	833m	Non-current assets end Dec:	231m	Equity:	89m	Revenue:	1,851m	Gross profit:	228m	Net profit:	25m	Assets end Dec:	3,896m	Non-current assets end Dec:	1,165m	Equity:	678m	Revenue:	3,359m	Gross profit:	207m	Net profit:	272m
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Contact Person(s)	Isabelle Barnard																								
Telephone	Work: +27 (0) 16 970 8900 Cell: +27 (0) 83 657 8973																								
Fax	+27 (0) 86 677 1462																								
Email Address	Isabelle.barnard@farmsecure.co.za																								
Project Partners Provide the following information for all project partners (copy and paste relevant sections of the table if information is to be provided on more than one partner organisation)																									
Name	J&J Timber Suppliers (Pty) Ltd																								
Nature of partner	Timber supplier																								
Organizational Category	Private Company																								
Legal Status (if private company)	Limited Company																								
Street Address	Boesmanspruit Farm, District of Ermelo, Mpumalanga province																								
Postal Address (if different to	P.O. Box: P.O. Box 536, Piet Retief, 2380																								

Street Address)	
Website Address	-
Main Activities	The sawmill processes raw wood into final products such as blocks, furniture and building material.
Contact Person(s)	Johann Ernst
Telephone	+27 (0) 17 820 0615; +27 (0) 83 265 0887
Fax	+27 (0) 17 820 0813
Email Address	jernst@lantic.net
Contractual Arrangements	
Contractual arrangements between various entities involved	The project is a joint venture between Farmsecure Carbon (Pty) Ltd and J&J Timber Suppliers (Pty) Ltd, run in an SPV named Busby Renewables (Pty) Ltd. Farmsecure Carbon is the majority shareholder who will develop, implement, operate and maintain the project and will therefore also act as the CPA implementer and will be responsible for the CPA

Part B: Project Overview (Technical Summary, Location and Schedule)

Technical Summary of the project		
Objective of the Project	<p>PoA: The PoA will involve renewable energy projects in South Africa where energy is derived from renewable biomass through gasification or direct combustion, thereby mitigating GHG emissions by displacing energy generated primarily from coal</p> <p>The further goal of this PoA is to ensure that all potential renewable energy projects from renewable biomass will be able to qualify under the CDM process of the Kyoto.</p> <p>The project will contribute to sustainable development in South Africa by promoting the development of renewable energy in the country. The project generates both local and global environmental benefits and also contributes to socio-economic development.</p> <p>CPA: The CPA is a biomass-based renewable energy project activity where a cogeneration plant will be installed to produce renewable electricity for supply to the national grid and therefore displaces fossil fuel use.</p>	
Project Description		
<p>PoA: Biomass-based renewable energy generation through gasification or direct combustion is the principal technology/measure to be applied in each CPA. CPAs may apply this renewable energy differently and therefore displace fossil fuels using different technology/measures.</p> <p>The following tables show the eligible measures/technologies and methodologies and specific project activity (e.g. new plant, addition, retrofit) under this PoA.</p> <p>Description of applicable technologies/measures and methodologies chosen for this PoA</p>		
Project scenarios	Applicable technologies/measures	Applicable Methodology

Technical Summary of the project

A.	Biomass based project activities that install new power plants that supply renewable electricity to the grid.	AMS-I.D
B.	Biomass based project activities that involve capacity addition to renewable electricity plants that supply electricity to the grid.	AMS-I.D
C.	Biomass based project activities that install new power plants that produce renewable electricity for captive use that displace electricity from the grid.	AMS-I.F
D.	Biomass based project activities that involve capacity addition to renewable electricity plants that produce electricity for captive use that displace electricity from the grid.	AMS-I.F
E.	Biomass based project activities that install thermal energy plants that produce renewable thermal energy for on-site consumption or for consumption by other facilities and displaces fossil fuel use.	AMS-I.C
F.	Biomass based project activities that install cogeneration plants that produce renewable electricity for supply to the grid and/or for captive use and/or renewable thermal energy for on-site consumption or for consumption by other facilities and displace fossil fuel use.	AMS-I.C
G.	Biomass based project activities that involve the addition of renewable thermal energy units at an existing renewable energy production facility.	AMS-I.C
H.	Biomass based project activities that seek to retrofit or modify an existing facility for the purpose of fuel switch from fossil fuels to biomass in heat generation equipment.	AMS-I.C
I.	For household or commercial applications/systems, whose maximum output capacity is less than 45 kW thermal and where it can be demonstrated that the metering of thermal energy output is not plausible.	AMS-I.C

CPA:

The CPA is a biomass-based renewable energy project activity where a cogeneration plant will be installed to produce renewable electricity for supply to the national grid and therefore displaces fossil fuel use. This cogeneration project will be integrated with the existing sawmill activity at J&J Timber Suppliers in Mpumalanga, South Africa. The project activity will also supply thermal energy to the existing sawmill. In the baseline scenario electricity is imported from the grid and thermal energy is produced from biomass, therefore, emission reductions from thermal energy generation are not eligible.

Project Constraints

Are there any constraints affecting project operations or commissioning? (Brief description: 1 paragraph or less)
Note: these may be due to energy supply, infrastructure, other resources etc.

The project is currently being developed by Farmsecure Carbon, and the criteria that still needs to be met before project finance is available to start construction include:

- Approval from Eskom regarding connection to their grid – this application process is done in two phases. Part 1 application has been submitted. Farmsecure now needs to accept the quotation from Eskom and pay the required connection fees. After the connection fees have been paid, Part 2 of the application will be submitted and then Farmsecure and Eskom will sign a Distribution Use of System (DUO'S) agreement.
- Farmsecure Carbon, the Independent Power Producer (IPP), will sell electricity to an independent power broker, who will 'wheel' it to their clients. There needs to be a back-to-back PPA between Farmsecure Carbon, the power broker and the client. The contract between Farmsecure Carbon and the power broker has been signed. The indications are that the PPA between the power broker and the client will be signed by October 2011
- Approval from the National Electricity Regulator South Africa (NERSA) is required for an electricity generation license. This application process with NERSA has commenced. Farmsecure now needs to submit the back-to-back PPA to NERSA to complete the application. NERSA will then grant the electricity generation license

<p>within 120 days.</p> <ul style="list-style-type: none"> • A legal screening process was conducted to determine the environmental legal requirements for the proposed plant. The process was evaluated in terms of the National Environmental Management Act, 1998 (Act 107 of 1998), the National Environmental Management Act: Waste Act, 2008 (Act 59 of 2008) and the National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004). In terms of the thresholds and legal definitions of the various acts it was determined that the plant would not require an Environmental Impact Assessment in terms of the above mentioned legislation. A letter of confirmation has been sent to the Department of Environmental Affairs to provide written confirmation on the above matter. There are no legislated timeframes for the review of a query, but generally, the response will be forthcoming within one to three weeks and the response is therefore expected towards the end of September 2012. • A Water Use Licence Applications will be submitted to Water Affairs. Water will be supplied to the plant from the existing boreholes on site. Groundwater Potential and Existing Groundwater Abstraction Capacity study was conducted for the three existing boreholes situated on the property. The study concluded that Borehole 03 can sustain the project's water demand. Groundwater Reserve Determination Study for the catchment has been executed in 2009. The Reserve makes provision for ecological and basic human needs. The study found that reserve requirements can be met, and that sufficient water is available for additional allocation in the catchment. 				
<p>Technology to be employed</p>	<p>PoA: Biomass Energy Generation through Gasification or Direct Combustion</p> <p>CPA: The selected technology for the Busby Renewables project is a conventional steam Rankine cycle. The energy from direct combustion of biomass is carried over to hot water in a pressurized boiler system. The water undergoes phase change in an evaporator and superheated. The superheated steam is expanded through a turbine where pressure and volume change is converted to shaft work. The shaft work generates electricity at a pre defined voltage supplied to an existing grid and distribution network.</p>			
<p>Greenhouse Gases Targeted</p>	<p>CO₂</p>			
<p>Emission reductions</p>	<p>CPA1 expected emission reductions 3 times 7 years: 62 512 CERs/a = 1 312 757 CERs in 21 years</p>			
<p>Baseline & Additionality Assessment</p>	<p>Additionality shall be demonstrated based on one of the following two approaches:</p> <p>Approach 1: Demonstration of additionality for microscale project activities</p> <p>Project activities up to five megawatts that employ renewable energy technology are additional if any one of the conditions in the 'Guidelines for demonstrating additionality of microscale' (Version 04.0) is satisfied.</p> <p>Guidelines for demonstrating additionality of microscale project activities (Version 04.0)</p> <table border="1"> <tr> <td>a) The geographic location of the project activity is in one of the least developed countries or the small island developing States (LDCs/SIDS) or in a special underdeveloped zone of the host country identified by the government before 28 May 2010</td> </tr> <tr> <td>b) The project activity is an off-grid activity supplying energy to households/communities (less than 12 hours grid availability per 24 hrs is also considered .off-grid. for this assessment)</td> </tr> <tr> <td>c) The project activity is designed for distributed energy generation (not connected to a national or regional grid) with both conditions (i) and (ii) satisfied <ul style="list-style-type: none"> i. Each of the independent subsystems/measures in the project activity is smaller than or equal to 1500kW electrical installed </td> </tr> </table>	a) The geographic location of the project activity is in one of the least developed countries or the small island developing States (LDCs/SIDS) or in a special underdeveloped zone of the host country identified by the government before 28 May 2010	b) The project activity is an off-grid activity supplying energy to households/communities (less than 12 hours grid availability per 24 hrs is also considered .off-grid. for this assessment)	c) The project activity is designed for distributed energy generation (not connected to a national or regional grid) with both conditions (i) and (ii) satisfied <ul style="list-style-type: none"> i. Each of the independent subsystems/measures in the project activity is smaller than or equal to 1500kW electrical installed
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	<p>capacity</p> <p>ii. End users of the subsystems or measures are households/communities/small and medium enterprises (SMEs).</p> <p>d) The project activity employs specific renewable energy technologies/measures recommended by the host country designated national authority (DNA) and approved by the Board to be additional in the host country.</p> <p>Approach 2: Demonstration of additionality for project activities above 5mw and less than 15mw</p> <p>According to “Attachment A of Appendix B” and the “Non-binding best practice examples to demonstrate additionality for SSC project activities” (Version 01.0), the CPA participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers:</p> <p>a) Investment barrier b) Access-to-finance barrier c) Technological barrier d) Barrier due to prevailing practice e) Other barriers</p> <p>The following guidelines will be followed to prove the additionality:</p> <ul style="list-style-type: none"> • “Guidelines for objective demonstration and assessment of barriers” (Version 01.0) • “Guidelines on the assessment of investment analysis” (Version 05.0) • “Guidelines on additionality of first-of-its-kind project activities” (Version 01.0) • “Non-binding best practice examples to demonstrate additionality for SSC project activities” (Version 01.0) 	
<p>Monitoring</p> <p>The Tables below show all the possible parameters to be monitored for the different project scenarios under the PoA. From these tables, the CME will compile a list of relevant parameters for each CPA in section D.7.2 of the CPA-DD. Further information on the source of data, details on the measurement methods and procedures and QA/QC procedures will be as describe in section D.7.1 of the CPA-DD</p> <p>CPAs shall monitor 100% of the relevant parameters included in Section D.7.1. of each CPA-DD. Monitoring reports will be prepared separately for all CPAs, however only a sample will be verified by the DOE. See the sampling procedure proposed for verification below in “Reporting and verification”.</p> <p>The following tables show all the parameters to be monitored under the PoA:</p> <p>Table 1.a Baseline parameters related to electricity generation to be monitored (additional parameters for co-fire projects are shown separately)</p> <p>Table 1.b Baseline parameters related to thermal energy generation to be monitored (additional parameters for co-fire projects are shown separately)</p> <p>Table 1.c Baseline emission parameters to be monitored for each project scenario under the PoA (project scenario A to I)</p> <p>Table 2 Project emission parameters to be monitored under the PoA</p> <p>Table 3. Leakage emission parameters and demonstrations to be monitored under the PoA</p> <p>Baseline emissions</p>		

Table 1.a. Baseline emission parameters to be monitored for electricity generation

Parameter	Description
$EG_{BL,y}$	The amount of net renewable electricity supplied to the grid or displaced from the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)
$B_{biomass,k,y}$	Quantity of biomass type k consumed in year y (ton/yr)
$NCV_{biomass,k,y}$	Net calorific value of the biomass type k consumed in year y (MJ/kg)
% water	Moisture content of the biomass type k (%)
<i>Additional parameters for co-fire project activities</i>	
$EG_{elec,total,y}$	The total amount of electricity generated from the co-fired projects activity in year (MWh/yr)
$FC_{FF,k,y}$	Quantity of fossil fuel type k consumed in co-fired system in year y (ton/yr)
$NCV_{FF,k,y}$	Net calorific value of the fossil fuel type k consumed in year y (MJ/kg)
$SFC_{elec,biomass,k}$	Specific fuel consumption for electricity production for biomass type k (ton/MWh)
$SFC_{elec,FF,k}$	Specific fuel consumption for electricity production for fossil fuel type k (ton/MWh)

Table 1.b. Baseline emission parameters to be monitored for thermal energy generation

Parameter	Description
$EG_{thermal,y}$	Net quantity of thermal energy supplied by the project activity during the year y (TJ/yr)
$Q_{hot\ air}$	Quantity of hot air (m^3/yr)
Q_{steam}	Quantity of steam (m^3/yr)
T	Temperature ($^{\circ}C$)
P	Pressure (kg/cm)
$B_{biomass,k,y}$	Quantity of biomass type k consumed in year y (ton/yr)
% water	Moisture content of the biomass (%)
$NCV_{biomass,k,y}$	Net calorific value of the biomass type k consumed in year y (TJ/ton)
<i>Additional parameters for co-fire project activities</i>	
$EG_{thermal,total,y}$	Total amount of thermal energy supplied by the co-fired project activity in year y (TJ/yr)
$FC_{FF,k,y}$	Quantity of fossil fuel type k consumed in co-fired system in year y (ton/yr)
$NCV_{FF,k,y}$	Net calorific value of the fossil fuel type k consumed in year y (MJ/kg)
$SFC_{thermal,biomass,k}$	Specific fuel consumption for thermal energy production for biomass type k (ton/TJ)
$SFC_{thermal,FF,k}$	Specific fuel consumption for thermal energy production for fossil fuel type k (ton/TJ)

Table 1.c. Baseline emission parameters to be monitored for each project activity

Project scenario	Parameters	Description
A and C	Table 1.a	
B and D	$EG_{PJ,add,y}$	The total net electrical energy supplied to a grid or displaced from the grid in year y by all units, existing and new project units (MWh/yr).
	$EG_{actual,y}$	The actual, measured net electrical energy supplied to the grid or displaced from the grid by the existing units in year y (MWh/yr).
E	Table 1.b	
F	Table 1.a + 1.b	
G	$EG_{thermal,PJ,y}$	Total actual thermal energy produced in year y by all units, existing and new project units (TJ/yr).
	$EG_{thermal,actual,y}$	The actual, measured thermal energy production of the existing units in year y (TJ/yr)
H	Table 1.b $EG_{thermal,retrofit,y}$	The net quantity of thermal energy supplied by the retrofit project activity during the year y (TJ).
I	Table 1.b η_{PJ}	Efficiency of the project equipment (%)

		Record annually the number of systems operating (evidence of continuing operation, such as on-going rental/lease payments could be a substitute), if necessary using survey methods; Estimate the annual hours of operation of an average system, if necessary using survey methods. Annual hours of operation can be estimated from total output (e.g. tonnes of grain dried) and output per hour if an accurate value of output per hour is available.
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Project emissions

Table 2. Project emission parameters

Parameter	Description
$FC_{i,j,y}$	Quantity of fossil fuel type i combusted in process j inside the project boundary in year y (ton/yr or m^3 /yr)
$NCV_{i,y}$	Weighted average net calorific value of the fossil fuel type i combusted inside the project boundary in year y (TJ/ton)
$EF_{CO_2,i,y}$	CO_2 emission factor of fossil fuel type i combusted inside the project boundary (tCO_2e /TJ)
$COEF_{i,y}$	The CO_2 emission coefficient of fuel type i in year y (tCO_2 /mass or volume unit)
EC_y	Quantity of electricity consumed in the project boundary in year y (MWh/yr)

Leakage emissions

Table 3.a. Leakage emission parameters for collection and procession of biomass

Parameter	Description
$FC_{c,j,y}$	Quantity of fossil fuel type c combusted in process j outside the project boundary in year y (ton/yr or m^3 /yr)
$NCV_{c,y}$	Weighted average net calorific value of the fossil fuel type c combusted outside the project boundary in year y (TJ/ton)
$EF_{CO_2,c,y}$	CO_2 emission factor of fossil fuel type c combusted outside the project boundary (tCO_2e /TJ)
$COEF_{c,y}$	The CO_2 emission coefficient of fuel type c in year y (tCO_2 /mass or volume unit)

Table 3.b. Leakage emission parameters for incremental transportation.

Parameter	Description
Q_y	Quantity of biomass transported outside the project boundary in the year y (t)
CT_y	Average truck capacity for transportation outside the project boundary (ton/truck)
DAF_w	Average incremental distance for biomass transportation outside the project boundary (km/truck)
VF_{cons}	Vehicle fuel consumption in litres per kilometre (ℓ /km)
D_{fuel}	Fuel density (kg/ℓ), if necessary
$NCV_{fuel,y}$	Net calorific value of the fuel used for transport outside the project boundary in year y (TJ/kg or other unit)
EF_{fuel}	Emission factor of the fuel for transport outside the project boundary (tCO_2e /TJ)
$EF_{CO_2/km}$	CO_2 emission factor from fossil fuel use due to transportation outside the project boundary (tCO_2e /km)

Table 3.c. Leakage emission parameters for the application of fertilizer

Parameter	Description
$M_{SFi,y}$	Mass of synthetic fertilizer type i applied (ton/yr)
$M_{OFj,y}$	Mass of organic fertilizer type j applied (ton/yr)
NC_{SFi}	Nitrogen content of synthetic fertilizer type i applied (gN/100 g fertilizer)
NC_{OFj}	Nitrogen content of organic fertilizer type j applied (gN/100 g fertilizer)

Table 3.d. Leakage emission parameters for the competing use of biomass

Parameter	Description
L_1	Demonstration that the biomass residue type k from a specific source would continue not to be collected or utilized
$BF_{available,k,y}$	Quantity of available biomass residues of type k or m in the region (ton/yr)
$BF_{utilized,k,y}$	Quantity of available biomass residues of type k or m that are utilized in the defined geographical region (ton/yr)
$EF_{CO_2,LE}$	CO ₂ emission factor of the most carbon intensive fuel used in the country (tCO ₂ /TJ)
$BF_{LE,n,y}$	Quantity of biomass residue type n used for heat generation as a result of the project activity during the year y and for which leakage can not be ruled out using one of the approaches L_1, L_2, L_3 or L_4 (tons of dry matter or liter)/yr
NCV_n NCV_m	Net calorific value of the biomass residue type n or m (TJ/ton)
Type of project/activities	
a. Energy Supply	Renewable biomass. PoA: Biomass Energy Generation through Gasification or Direct Combustion CPA1: The CPA is a biomass-based renewable energy project activity where a cogeneration plant will be installed to produce renewable electricity for supply to the national grid and therefore displaces fossil fuel use. This cogeneration project will be integrated with the existing sawmill activity at J&J Timber Suppliers in Mpumalanga, South Africa. The project activity will also supply thermal energy to the existing sawmill. In the baseline scenario electricity is imported from the grid and thermal energy is produced from biomass, therefore, emission reductions from thermal energy generation are not eligible.
b. Energy Demand	-
c. Industrial Process	-
d. Transport	-
e. Waste Management	-
f. Forestry/ land use	-
g. Other	-
Project Boundary	
<p>The spatial extent of the project boundary encompasses:</p> <ul style="list-style-type: none"> • All plants generating power and/or heat located at the project site, whether fired with biomass, fossil fuels or a combination of both; • All power plants connected physically to the electricity system (grid) that the project plant is connected to; • Industrial, commercial or residential facility, or facilities, consuming energy generated by the system and the processes or equipment affected by the project activity; <p>Associated emissions from transportation of biomass and the processing plant of biomass residues for project activities using solid biomass fuel (e.g. briquette) shall be accounted for as leakage.</p>	
Indicate Emissions outside the Project Boundary	<p>PoA: Leakage emissions from the renewable energy project activity consist of:</p> $LE_y = LE_{FC,j,y} + LE_{transp,y} + LE_{renewable\ biomass,y}$ <p>Where:</p> <p>$LE_{FC,j,y}$ Leakage emissions from collection/processing of biomass outside the project boundary during year y (tCO₂e/yr).</p> <p>$LE_{transp,y}$ Leakage emissions from transportation of biomass outside the</p>

	<p>project boundary during year y ($\text{tCO}_2\text{e/yr}$).</p> <p>$LE_{renewable\ biomass,y}$ Leakage emissions from project activities involving renewable biomass during year y ($\text{tCO}_2\text{e/yr}$).</p> <p>Leakage emissions from project activities involving renewable biomass:</p> <p>For small scale CDM project activities involving renewable biomass there are three types of emissions sources that are potentially significant (>10% of emission reductions) and attributable to the project activities.</p> <p>$LE_{renewable\ biomass} = LE_{shift} + LE_{production} + LE_{competing}$</p> <p>Where:</p> <p>$LE_{shift}$ Leakage due to shifts of pre-project activities ($\text{tCO}_2\text{e/yr}$).</p> <p>$LE_{production}$ Leakage due to emissions related to the production of the biomass ($\text{tCO}_2\text{e/yr}$).</p> <p>$LE_{competing}$ Leakage due to competing uses for the biomass ($\text{tCO}_2\text{e/yr}$).</p> <p>CPA1: Leakage emissions for CPA1 was calculated as zero</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Unit</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>$LE_{FC,j,y}$</td> <td>$\text{tCO}_2\text{e/yr}$</td> <td>0</td> </tr> <tr> <td>$LE_{transp,y}$</td> <td>$\text{tCO}_2\text{e/yr}$</td> <td>0</td> </tr> <tr> <td>$LE_{renewable\ biomass,y}$</td> <td>$\text{tCO}_2\text{e/yr}$</td> <td>0</td> </tr> <tr> <td>LE_y</td> <td>$\text{tCO}_2\text{e/yr}$</td> <td>0</td> </tr> </tbody> </table> <p>Leakage emissions from project activities involving renewable biomass:</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Unit</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>LE_{shift}</td> <td>$\text{tCO}_2\text{e/yr}$</td> <td>0</td> </tr> <tr> <td>$LE_{production}$</td> <td>$\text{tCO}_2\text{e/yr}$</td> <td>0</td> </tr> <tr> <td>$LE_{competing}$</td> <td>$\text{tCO}_2\text{e/yr}$</td> <td>0</td> </tr> <tr> <td>$LE_{renewable\ biomass}$</td> <td>$\text{tCO}_2\text{e/yr}$</td> <td>0</td> </tr> </tbody> </table>	Parameter	Unit	Value	$LE_{FC,j,y}$	$\text{tCO}_2\text{e/yr}$	0	$LE_{transp,y}$	$\text{tCO}_2\text{e/yr}$	0	$LE_{renewable\ biomass,y}$	$\text{tCO}_2\text{e/yr}$	0	LE_y	$\text{tCO}_2\text{e/yr}$	0	Parameter	Unit	Value	LE_{shift}	$\text{tCO}_2\text{e/yr}$	0	$LE_{production}$	$\text{tCO}_2\text{e/yr}$	0	$LE_{competing}$	$\text{tCO}_2\text{e/yr}$	0	$LE_{renewable\ biomass}$	$\text{tCO}_2\text{e/yr}$	0
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$LE_{FC,j,y}$	$\text{tCO}_2\text{e/yr}$	0																													
$LE_{transp,y}$	$\text{tCO}_2\text{e/yr}$	0																													
$LE_{renewable\ biomass,y}$	$\text{tCO}_2\text{e/yr}$	0																													
LE_y	$\text{tCO}_2\text{e/yr}$	0																													
Parameter	Unit	Value																													
LE_{shift}	$\text{tCO}_2\text{e/yr}$	0																													
$LE_{production}$	$\text{tCO}_2\text{e/yr}$	0																													
$LE_{competing}$	$\text{tCO}_2\text{e/yr}$	0																													
$LE_{renewable\ biomass}$	$\text{tCO}_2\text{e/yr}$	0																													

Location of the Project	
Province	Mpumalanga
Municipality	Mkondo Municipality
Nearest city/large town	Piet Retief
Brief description of the location of the project site	J&J Timbers is situated between Ermelo and Piet Retief in the eastern part of Mpumalanga in South Africa (26°48'51.40"S, 30°26'27.33"E and 1443 m above sea level). The project site will be where the existing boiler is currently

Project Schedule/Timetable	
Earliest Project Start Date	01/05/2013 (construction or real action of a project activity begins)
When is the expected first year of CER delivery	Crediting period is expected to start 01/07/2014
Project Lifetime	20 years
Project End Date	01/07/2034
Crediting Period	3 times 7 years, with reassessment of baseline for each 7 year renewal
Current Status or phase of the	Preparation

Project Schedule/Timetable	
project	
DNA Approval	Project as not been submitted to the DNA previously
Approval by other bodies	<p><i>Has this project (or any elements of the project) been submitted to any other national, provincial or local government departments or agencies for regulatory or legal approval (excluding EIA process – see Part C). If so – provide brief details.</i></p> <p>Approval from NERSA is required for an electricity generation license. This application process with NERSA has commenced. Farmsecure now needs to submit the back-to-back PPA to NERSE to complete the application. NERSA will grant the the electricity generation license within 120 days.</p> <p>A Water Use Licence Applications will be submitted to Water Affairs. Water will be supplied to the plant from the existing boreholes on site. Groundwater Potential and Existing Groundwater Abstraction Capacity study was conducted for the three existing boreholes situated on the property. The study concluded that Borehole 03 can sustain the project's water demand. Groundwater Reserve Determination Study for the catchment has been executed in 2009. The Reserve makes provision for ecological and basic human needs. The study found that reserve requirements can be met, and that sufficient water is available for additional allocation in the catchment.</p>

Part C: Performance Against the DNA's Sustainable Development Criteria

South Africa has identified the following sustainable development criteria and indicators against which each CDM project will be assessed. Please provide your interpretation of how this project will address each of these **criteria and indicators** where they are relevant to the project. If the space provided is not sufficient please append additional information as required.

NOTE: For all indicators which are of relevance to the project show how the performance of the project against these indicators can be objectively monitored and measured on an ongoing basis.

1. Economic: Does the project contribute to national economic development?

The project will contribute towards economic development in the following ways:

- The project will provide business opportunities for biomass suppliers, local labour contractors and equipment suppliers which will help increase the income of the people who are directly or indirectly connected with the project.
- The project provides the potential for new sources of revenue from renewable energy, raises the economic benefits for the forestry industry, and promotes utilization of forestry residues, hence building a sustainable and circular economy.
- Taxable income from the project over the project lifespan.

2. Social: Does the project contribute to social development in South Africa?

- This project will increase local employment for skilled labour during construction and implementation of the renewable energy plant.
- The renewable energy plant will permanently employ the following skilled labour for the operation and maintenance of the plant: 6 foreman, 6 millwrights and 12 operators. These people will be empowered with skills

relating to the renewable energy plant.

- The renewable energy plant will also increase job opportunities for un-skilled labour as it is required for the harvesting and transportation of biomass to the renewable energy plant. This job opportunity consist of the following two levels:
 - Job opportunities to ensure biomass availability to the plant. This will consist of minimum 30 permanent employees, consisting of Bell drivers and their assistants, truck drivers and biomass packers.
 - There is also a community aspect to the biomass collection, where the community may collect plantation residues to weigh on a weighbridge and earn cash immediately. The prediction is that around 100 informal jobs will be created in this way.
- Over and above the employment opportunities mentioned above, management, operational and maintenance staff will receive internal and external training on the project that will increase their skill base and allow effective management, operation and maintenance of the project.

3. Environmental: Does the project conform to the National Environmental Management Act principles of sustainable development?

<p>i) That the disturbance of ecosystems and loss of biological diversity are avoided, or where they cannot be avoided, are minimised and remedied</p>	<p>The project will be implemented on a brown-fields site. The existing boiler is positioned here and the current land-use zoning is for industrial use. There will be no disturbance of ecosystems and loss of biological diversity. The biomass source (plantation residue) is obtained from an existing plantation, and as such no new fields will be cultivated.</p>
<p>ii) That pollution and degradation of the environment are avoided, or where they cannot be altogether avoided, are minimised and remedied</p>	<p>Currently plantation residues are burnt in order to prevent fires in new or existing forest plantations. In this process uncontrolled emissions of particulate matter, Sulphur Dioxide and Oxides of Nitrogen are released to the atmosphere. In the project activity release of these substances to the atmosphere will be substantially decreased through air quality control equipment.</p> <p>The project further mitigates green house gas emissions by displacing energy generated primarily from fossil fuels (coal) in a system of a circular and renewable metabolism.</p> <p>In addition, all applicable South African legislation will be adhered to in terms of potential pollution, both during the construction, operational and potential decommissioning phase.</p>
<p>iii) That the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied</p>	<p>The project will be implemented on the brown-fields site where the existing boiler is positioned, the current land-use zoning is for industrial use. There will be no disturbance of landscapes and sites that constitute the nation's cultural heritage.</p>
<p>iv) That waste is avoided, or where it cannot be altogether avoided, minimised and reused or recycled where possible and otherwise disposed of in a responsible manner</p>	<p>The process will play an important role in the re-use of plantation and sawmill residue material, thus preventing these materials going to waste. The process will produce ash as a by-product. This will be used as fertilizer to be applied back to the plantations where the biomass originated. This is in line with the national waste management policy to reduce/re-use/re-cycle. The wood ash thus generated will contain no hazardous elements, given that only virgin residue materials are used.</p>
<p>v) That the use and exploitation of non-renewable resources is responsible and equitable, and takes into account the consequences of the depletion of the resource</p>	<p>No non-renewable resources are used in the process. By the nature of the project, renewable resources (biomass residues) are used to generate renewable electricity. Power requirements for the project are generated by the project.</p>
<p>vi) That the development, use and exploitation of renewable resources is responsible and equitable, and takes into account the consequences of the depletion of the resource.</p>	<p>The project utilizes biomass residues (a renewable resource) for the generation of renewable energy, which is aligned with the South African renewable energy policy and targets. The combustion technology and process has been optimized to ensure maximum efficiency, and thereby</p>

	optimum utilization of biomass residues. The combustion process will be dry-cooled, thus limiting water use. Water will also be recycled.
vii) That a risk averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions	Established technology that has been implemented in numerous countries worldwide will be implemented in order to minimize not only the financial risks, but also the risk of pollution. An environmental management plan (EMP) for the operation will be compiled and implemented. The EMP will take any environmental risk into account and prescribe preventive measures.
vii) That negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied	The nature of the project is such that the negative impacts on the environment from current practices will in fact, be improved. Mitigating measures for the small risk of negative environmental impacts from the technology itself will be taken in accordance with South African legislation as well as the EMP. The project will not have an impact on the livelihood of any community, nor on environmental goods and services supplied by the commons.
Other comments Please provide any other comments on how this project contributes to sustainable development in South Africa (optional)	

Indicators in Support of the Project Approval Criteria

Category	Indicator	Comment
Environmental	<p style="text-align: center;">Impact on local environmental quality</p>	<ul style="list-style-type: none"> • Impact of the project on air quality • Impact of the project on water pollution • Impact of the project on the generation or disposal of solid waste • Any other positive or negative environmental impacts of the project (such as impacts on noise, safety, visual impacts, or traffic) <p>Air quality: Currently plantation residues are burnt in order to prevent fires in new or existing forest plantations. In this process particulate matter, Sulphur Dioxide and Oxides of Nitrogen are released to the atmosphere. In the project activity release of these substances to the atmosphere will be decreased through the installation of effective air quality control equipment. Emissions will comply with South African National Air Quality Standards.</p> <p>Water: The dry cooling is a closed loop system and there will be no wastewater.</p> <p>Waste: The process will produce ash as a by-product. This will be used as fertilizer back to the plantations where the biomass originated. The ash has a positive effect on soil fertility and it has to be noted that only virgin biomass residues will be used</p> <p>Given the location on a brownfields site, no additional visual, noise or safety impacts are created. Roads that will be used are mainly plantation service roads, and as such no detrimental impact on traffic flow patterns will take be caused.</p> <p>The project will have significant positive environmental impacts, in that uncontrolled biomass burning will be curbed and renewable energy will be created.</p>

Indicators in Support of the Project Approval Criteria

Category	Indicator	Comment
	Change in usage of natural resources	<ul style="list-style-type: none"> • Impact of the project on community access to natural resources • Impact of the project on the sustainability of use of water, minerals or other non renewable natural resources • Impact of the project on the efficiency of resource utilisation
	Impacts on biodiversity and ecosystems	<ul style="list-style-type: none"> • Changes in local or regional biodiversity arising from the project

- The project will be implemented on private, developed land in a rural setting and will have no impact on community access to natural resources .
- A Groundwater Reserve Determination Study for the catchment has been executed in 2009. The Reserve makes provision for ecological and basic human needs. The study found that reserve requirements can be met, and that sufficient water is available for additional allocation in the catchment. A water use licence application will be submitted to the Department of Water Affairs.
- No non-renewable resources will be used during the operational phase of the project.
- The project, by its nature, converts residues to energy, and thus efficiently utilizes resources.

The project will be implemented on a brownfields site where the existing boiler is positioned. There will be no disturbance of ecosystems and loss of biological diversity.

Indicators in Support of the Project Approval criteria

Category	Indicator	Comment
Economic	Economic impacts	<ul style="list-style-type: none"> • Impact of the project on foreign exchange requirements • Impact of the project on existing economic activity in the area • Impact of the project on the cost of energy • Impact of the project on foreign direct investment
	Appropriate technology transfer	<ul style="list-style-type: none"> • Positive or negative implications for the transfer of technology to South Africa arising from the project • Impacts of the project on local skills development • Demonstration and replication potential of the project

- The project will provide business opportunities for biomass suppliers, local labour contractors and equipment suppliers which will help increase the income of the people who are directly or indirectly connected with the project.
- The project provides the potential for new sources of revenue from renewable energy, raises the economic benefits for the forestry industry, and promotes utilization of forestry residues, hence building a sustainable and circular economy.
- The project will create positive economic impacts through the provision of local job opportunities.
- The project will not impact on the cost of local energy or water.

- The technology employed by the project has been implemented widely in foreign countries. The technology is based on the latest development and no outdated or inferior technology will be used. The local and global energy crisis and international and local government policy and legislation are driving the renewable energy market. The technology employed will enhance the capability and skill of South Africans to participate in this market, and contribute to national targets in this regard.
- In addition to the above, local skills will be advanced in the understanding, operation and maintenance of the technology. These skills are transferrable.
- The technology is replicable

Indicators in Support of the Project Approval Criteria

Category	Indicator	Comment
Social	Alignment with national provincial and local development priorities	<ul style="list-style-type: none"> • How the project is aligned with provincial and national government objectives • How the project is aligned with local developmental objectives • Impact of the project on the provision of, or access to, basic services to the area • Impact of the project on the relocation of communities if applicable • Contribution of the project to a any specific sectoral objectives (for example, renewable energy targets)
	Social equity and poverty alleviation	<ul style="list-style-type: none"> • Impact of the project on employment levels? (specify the number of jobs created/lost; the duration of time employed, distribution of employment opportunities, types of employment, categories of employment changes in terms of skill levels and gender and racial equity) • Impact of the project on community social structures • Impact of the project on social heritage • Impact of the project on the provision of social amenities to the community in which the project is situated • Contribution of the project to the development of previously underdeveloped areas or specially designated development nodes

- National government has set objectives in terms of renewable energy generation and the reduction of greenhouse gases. The project aligns with these objectives.
 - The project will provide part-time as well as full-time employment to South Africans.
 - The project has the potential to provide renewable electrical power to sections of the local area.
 - The project will not have an impact on the relocation of communities.
-
- This project will increase local employment for skilled labour during construction and implementation of the renewable energy plant.
 - The renewable energy plant will permanently employ the following skilled labour for the operation and maintenance of the plant: 6 foreman, 6 millwrights and 12 operators. These people will be empowered with skills relating to the renewable energy plant.
 - The renewable energy plant will also increase job opportunities for unskilled labour as it is required for the harvesting and transportation of biomass to the renewable energy plant. This job opportunity consist of the following two levels:
 - Job opportunities to ensure biomass availability to the plant. This will consist of minimum 30 permanent employees, consisting of Bell drivers and their assistants, truck drivers and biomass packers.
 - There is also a community aspect to the biomass collection, where the community may collect plantation residues to weigh on a weighbridge and earn cash immediately. The prediction is that around 100 jobs will be created in this way.
 - The project will not impact on social heritage, amenities or community social structures, due to being on existing private brownfields land. The site is located in the vicinity of a large urban centre and is therefore in tune with current accepted local economic activities.

Indicators in Support of the Project Approval Criteria

Category	Indicator	Comment
General	General Project Acceptability <ul style="list-style-type: none"> • Are the distribution of project benefits deemed to be reasonable and fair? 	<ul style="list-style-type: none"> • The project will contribute to national targets for renewable energy, thereby improving the carbon footprint of RSA. • Additional job opportunities will be created. • Through the generation of renewable energy, the opportunity are created for receiving company's to improve their environmental profile.

Part D: Finance

Project Costs	
Development Costs (R's)	R 3 812 500
Installed Costs (R's)	Capital: R 213 157 942
Other Costs (R's)	Contingency: 10 657 897 Finance negotiation fee: 3 414 425
Total Project Costs (R's)	R 231 042 765
Sources of Finance	
Equity	<i>Name of Organisation(s) and amount (R's) contributed by each</i> None
Debt (long term)	<i>Name of organization(s) and amount (R's) for each</i> Nedbank will facilitate in raising debt funding in the capital market for a Farmsecure corporate bond.
Debt (short term)	<i>Name of organization(s) and amount (R's) for each</i> None
Amount not identified (R's)	<i>Amount (R's) and a brief summary of the needs and any outstanding issues (1 paragraph or less)</i> None
Total CDM Contribution sought	<i>Amount (R's) and a brief summary of the needs and any outstanding issues (1 paragraph or less)</i> R8,6 million in 2015 (first full year of production) @ €11/CER
Expected Price of CER in case of a contract to purchase for: A period of 7 years A period of 10 years A period of 14 years (2x7 years)	No ERPA has been sigend
Indicate the projected Internal Rate of Return for the project with and without CER revenues.	Without CERs: 12.1% With CERs: 15.3% CER price:€11/CER
Constraints on tradability of carbon credits	<i>Have any commercial arrangements been made that may impact the tradability of the carbon emission reductions? If yes, please define.Note. Examples would be subjection to a mortgage, government tax etc.</i>

	None
Preliminary discussions with potential purchasers	<i>Have you had any preliminary discussions with any potential purchasers of the carbon credits (CERs) If yes, please give brief details.</i> Nedbank, as project financier would be interested in the CERs, and Evolution markets would also be willing to purchase the CERs.