Clean Development Mechanism South Africa
Designated National Authority

energy
Department:
Energy
REPUBLIC OF SOUTH AFRICA

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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	Dundee Biogas Power (Pty) Ltd
Date of Submission of PDD	4 June 2012

Project Developer	
Name	*Dundee Biogas Power (Pty) Ltd.*
Organizational Category	*Private Company*
Legal Status	*Privately Held Company; ("Special Purpose Vehicle", established for the sole purpose of the Dundee Biogas Power project)*
Street Address	Werda Street 3 Loeriesfontein 8185
Postal Address (if different from above)	Private Bag X 5008 Stellenbosch 7599
Website Address	n/a

Main Activities	*Generation and selling of electricity by means of anaerobic digestion (biogas generation, ultimately producing electricity from biogas). All operations and activities related to the Dundee Biogas facility and project will be performed and executed under this entity. All agreements and licenses for the facility are applied for and approved under this entity.*
Summary of Financial Performance in last fiscal year	*All development funds up to date have been lodged against this entity. Neither cash flow nor income has been generated as the project is currently under development.*
Contact Person(s)	Wiehann van Zyl
Telephone	Work: (+27) 86 100 4637 International calls: (+27) 021-886-5790 Cell: (+27) 71 683 1118
Fax	(+27) 86 608 8181
Email Address	wiehann@solek.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	Solek Innovations CC
Nature of partner	Project developer
Organizational Category	Private company
Legal Status (if private company)	Privately held company - Close Corporation (cc)
Street Address	3 Werda Street Loeriesfontein 8185 Northern Cape South Africa
Postal Address (if different to Street Address)	Private Bag X 5008 Stellenbosch 7599
Website Address	www.solek.co.za
Main Activities	Solek was founded in 1988 within the Northern Cape where off-grid solar system design and installation were the main focus and business for more than twenty years. Solek opened their offices in Stellenbosch in 2008 and ever since operated within a broader range of project development within the renewable energy sector, including development of utility scale projects such as Dundee Biogas Power.
Contact Person(s)	Wiehann van Zyl (Director)
Telephone	Work:086-100-4637; Work: (+27) 021-886-5790 (International) Cell: (+27) 071-683-1118
Fax	086-608-8181
Email Address	wiehann@solek.co.za

Project Partners	
Name	AFT Property Trust
Nature of partner	Land owner
Organizational Category	Private Company
Legal Status (if private company)	Privately held company (Family Trust)
Street Address	Glen Farm Dundee South Africa
Postal Address (if different to Street Address)	Po Box 195 Dundee 3000
Website Address	n/a
Main Activities	Operating farm #2 of Maybole, Dundee, Kwazulu-Natal, South Africa. All farming activities are managed and overseen by the AFT Property Trust and the trust board.
Contact Person(s)	Anton Ferreira
Telephone	Work:(+27) 034-212-3716
Fax	(+27) 034-218-1188
Email Address	aft@telkomsa.net

Project Partners	
Name	Triple C Feedlot (Pty) Ltd.
Nature of partner	Operating entity of the Triple C feedlot
Organizational Category	Private Company
Legal Status (if private company)	Privately held company
Street Address	Maybole Farm Dundee South Africa
Postal Address (if different to Street Address)	Po Box 1723 Dundee 3000
Website Address	n/a
Main Activities	Operating the Triple C feedlot on farm #2 of Maybole, Dundee, Kwazulu-Natal, South Africa. All feedlot activities are managed and overseen by Triple C employers in close collaboration with AFT.
Contact Person(s)	Anton Ferreira Wimpie Annandale
Telephone	Work: (+27) 034-212-3716
Fax	(+27) 034-218-1334
Email Address	crafcor@kznatal.co.za

Contractual Arrangements	
Contractual arrangements between various entities involved	Solek Innovations CC and AFT signed a Memorandum of Understanding in 2009, stipulating an arranged joint venture agreement between the companies for the development of a biogas project under the special purpose vehicle of "Dundee Biogas Power (Pty) Ltd.". Solek signed a contract with AFT in 2011, securing the land, access and use rights; securing of manure, water, electricity requirements as provided by AFT. Solek performs all required development activities. All approved licenses, revenue generated and cost incurred is held against the registered SPV, Dundee Biogas Power (Pty) Ltd. The owner therefore of the future CERs generated is hedged and should be held in this company, Dundee Biogas Power (Pty) Ltd.

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

Technical Summary of the project	
Objective of the Project	Implementing a "Waste-to-Energy" project utilizing animal manure as feedstock to generate renewable energy by means of anaerobic digestion. In turn anaerobic digestion generates biogas, which is intended to be used as fuel source for gas engines to generate electricity. Utilising methane as fuel source for electricity generation avoids atmospheric release of methane while simultaneously substituting fossil fuel based electricity with this produced renewable energy.

Project Description

The Triple C Feedlot operating on Farm Maybole 2419 will be the main supplier of animal (cattle) manure necessary for the operation of the biogas (methane) digester. The concentration of cattle at the feedlot (maximum capacity of 18 000 heads of cattle) results in a significant amount of animal manure accruing at the site. There is a second feedlot (AFT feedlot) in close proximity to the Triple C feedlot. The AFT feedlot is used to act as source of additional manure source should this be required. The AFT feedlot has approximately 6000 cattle and 4500 sheep constantly available within the AFT feedlot. An additional 9000 T/a of chicken manure have been secured for the facility from nearby laying farms.

Current waste management practices are less effective and hold potential for environmental and health problems. In terms of waste management, the proposed biogas facility will be a major improvement on the current farming and feedlot waste management practices.

The proposed biogas plant will allow for the managing of up to 75-100% of the cattle manure generated by the existing feedlot on Farm 2419. The wastes from Farm 2419 will can be supplemented with the secured chicken manure from surrounding chicken laying farms.

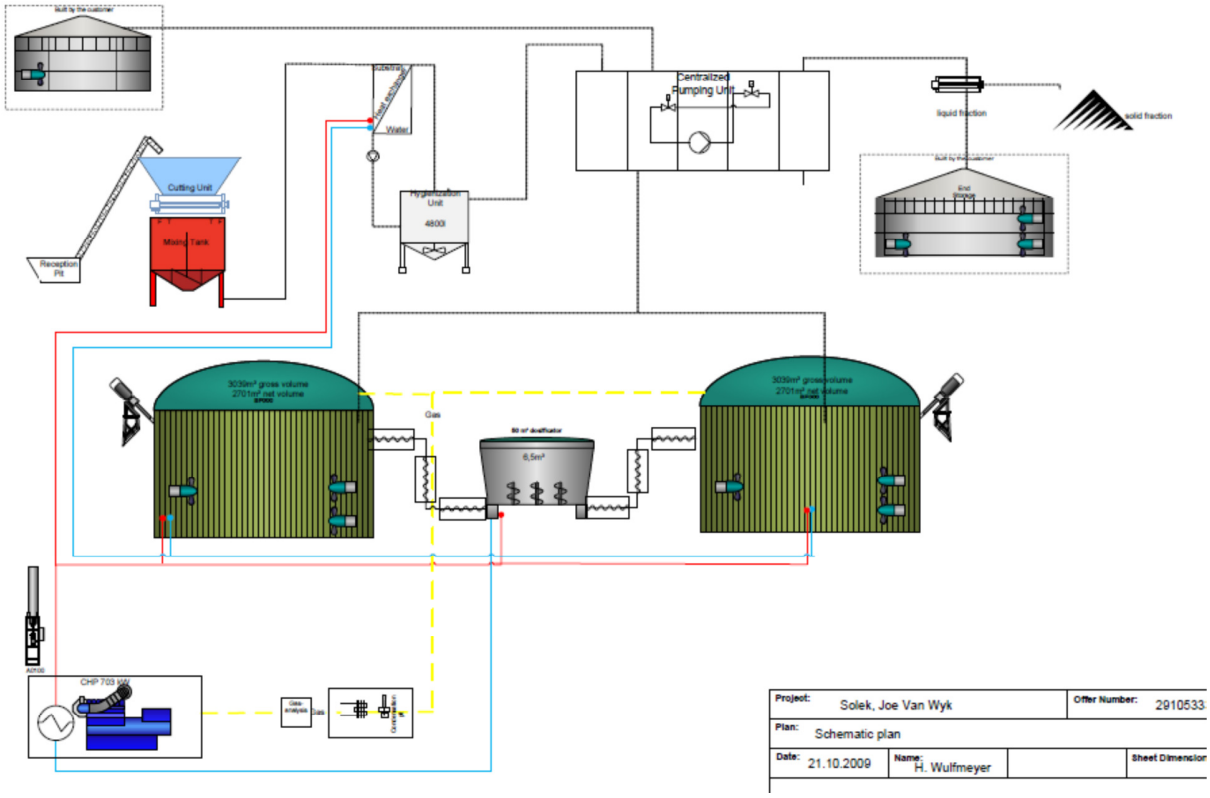
The waste fed into the facility will be converted to biogas (high methane content) under required anaerobic digestion (within the biogas plant), added heat and mechanical stirring increases the efficiency of biogas production. The biogas (high methane content) will then be combusted in a gas engine, generating electricity (effectively offsetting fossil fuel based electricity).

The proposed biogas digester system will consist of, amongst others, up to six digesters and six gas generator units and will generate approximately 2.22 MW of electricity (equivalently 8 million m^3 of biogas) upon completion. As an existing farming and feedlot operation, the infrastructure and roads are already in place and in use. The development footprint of the facility will not exceed 1ha in size. The lease diagram of the facility is intended to be surveyed for a 5ha area.

Technical Summary of the project

Dundee Biogas facility will generate electricity which the Applicant intends to sell to ESKOM or private company using ESKOM's network for distribution. The electricity generated by the facility will feed into the national ESKOM grid to augment the national electricity supply.

The biogas plant consists of different sections, sub-sections and parts. A layout diagram of the facility is attached below.



To summarise the facility has three main sections: Pre-digester feeding infrastructure; Digesters (anaerobic digestion takes place); Post-digester (nutrient rich slurry to fields and gas to generator sets).

Project Constraints

No constraints affecting project operations or commissioning due to energy supply, infrastructure or other resources have been identified.

Technology to be employed	Anaerobic digestion process in which micro-organisms break down biodegradable material in the absence of oxygen. The generated methane from the process is upgraded and purified before utilising the produced gas for electricity generation (gas engines). The intended supplier that will erect and supply the physical plant is a well-known German technology supplier. The company has more than 200 plants in operation across the globe. But so far no facilities have been constructed within South Africa. A clear and precise training program is in place to enable the facility manager to operate and maintain the biogas facility. Adequate training will be provided for all personnel involved, with a training program being implemented. The technology supplier will provide service in operating the facility on "as needed" basis.

<table>
<tr><th colspan="2">Technical Summary of the project</th></tr>
<tr><td>Greenhouse Gases Targeted</td><td>CH_4 and CO_2</td></tr>
<tr><td>Emission reductions</td><td>
<table>
<tr><th>Year</th><th>CERs</th></tr>
<tr><td>01/06/2014-31/12/2014</td><td>8,292</td></tr>
<tr><td>01/01/2015-31/12/2015</td><td>14,214</td></tr>
<tr><td>01/01/2016-31/12/2016</td><td>21,321</td></tr>
<tr><td>01/01/2017-31/12/2017</td><td>28,429</td></tr>
<tr><td>01/01/2018-31/12/2018</td><td>28,429</td></tr>
<tr><td>01/01/2019-31/12/2019</td><td>28,429</td></tr>
<tr><td>01/01/2020-31/12/2020</td><td>28,429</td></tr>
<tr><td>01/01/2021-31/12/2021</td><td>28,429</td></tr>
<tr><td>01/01/2022-31/12/2022</td><td>28,429</td></tr>
<tr><td>01/01/2023-31/12/2023</td><td>28,429</td></tr>
<tr><td>01/01/2024-31/05/2024</td><td>11,845</td></tr>
<tr><td>Total Estimation of Emission reductions (tons of CO_2e)</td><td>254,675</td></tr>
<tr><td>Crediting period (years)</td><td>10 Years</td></tr>
<tr><td>Annual Average of Emission reductions (tons of CO_2e)</td><td>25,467</td></tr>
</table>
The emission reductions derives from methane avoidance as well as substitution of fossil fuel based electricity. A 10 year fixed crediting period is selected with total emissions estimated to be 254,675 TCO_2e.
</td></tr>
<tr><td>Baseline & Additionality Assessment</td><td>An Investment barrier analysis has been made available in the PDD, where the IRR is analyzed with and without the CDM revenue. The IRR have been compared to the national benchmark rate to demonstrate that the proposed project activity is not likely to be the most financially attractive option without CDM revenue.</td></tr>
<tr><td>Monitoring</td><td>The following main parameters will be monitored. The amount of biogas recovered and fuelled, flared or used gainfully will be monitored using flow meters corrected to standard value. The methane content in the biogas will be analyzed with gas analyzers. Annual livestock population will be used for crosscheck of biogas generation. Electricity generation and consumption will be monitored with electrical meters.</td></tr>
<tr><td>Type of project/activities</td><td>Methane recovery in animal manure management system” - The purpose of the project is to install an anaerobic digestion (AD) based manure treatment system with methane recovery equipment. Streams obtained after treatment will be used as liquid fertilizers in farmland irrigation and thus not discharged into natural water resources.</td></tr>
</table>

Technical Summary of the project	
	"Grid connected renewable electricity generation" - In the project activity, biogas generated from the anaerobic digester(s) can be used for electricity generation, and the power generated can be supplied to the power grid, displacing electricity supplied from ESKOM.
a. Energy Supply	*Renewable Energy*. Biogas generated from the anaerobic digester(s) can be used for electricity generation either under the Government subsidy scheme (IPP procurement program) or sold to the grid by means of a wheeling arrangement.
b. Energy Demand	The facility requires energy to operate. The energy demand will be attained from the grid and forms part of the electricity application at ESKOM.
c. Industrial Process	*Not applicable*.
d. Transport	Transportation requirements are limited to the supply of chicken manure and transportation of AFT feedlot manure (should these be used).
e. Waste Management	The purpose of the project is to install an anaerobic digestion (AD) based manure treatment system with methane recovery equipment, effectively acting as a waste management facility.
f. Forestry/ land use	The Department of Agriculture issued consent for land-use. The long term lease (>10 years) application has been approved by the Department of Agriculture, Forestry and Fisheries. The formal approval letter will be issued by the Department once the ground resoning have been completed as required by the Provincial Development Act (currently within the last phase of approval).
g. Other	Not applicable
Project Boundary As per AMS.III.D, the project boundary is physical, geographical site of the livestock and manure management systems, and the facilities which recover and flare/combust or use methane. As per AMS.I.D the spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to.	

Technical Summary of the project

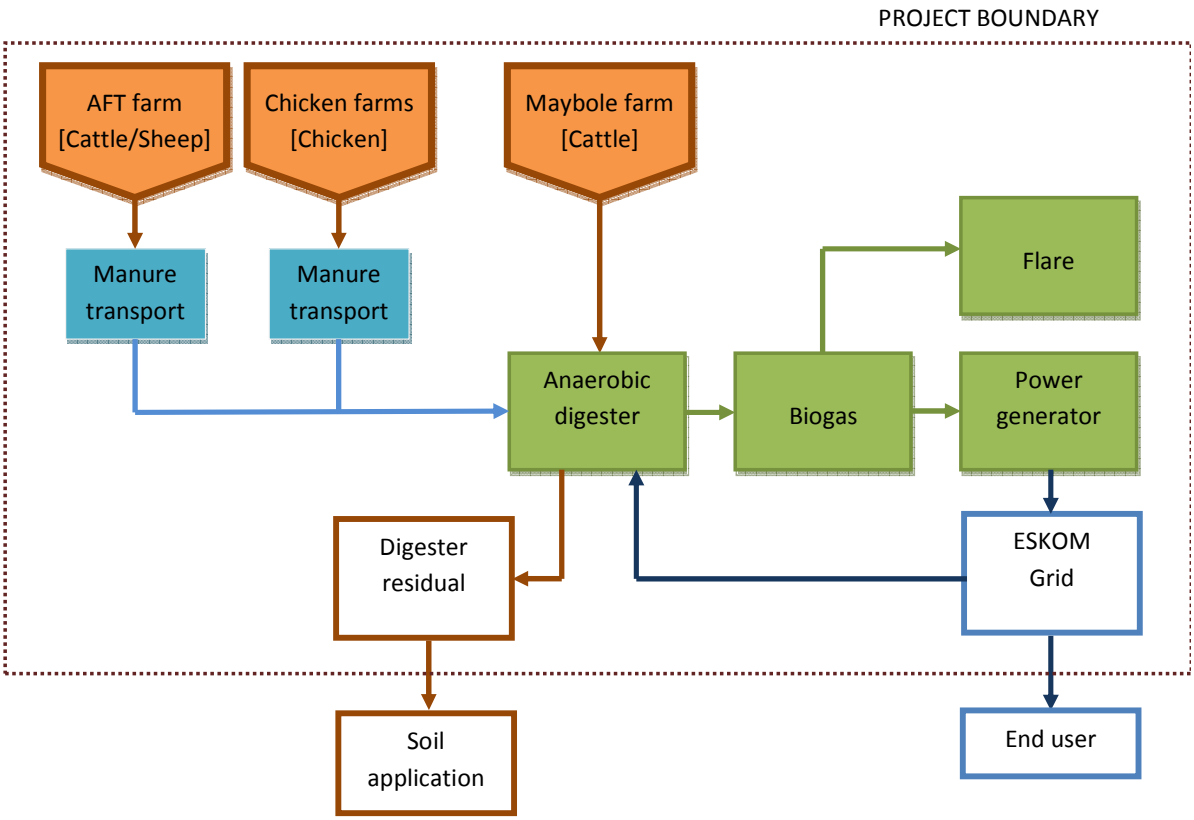


Figure: Project boundary

The bellow listed farms are included in the project boundary and are the supplier of the raw material source in the form of manure:

Farm name/owner	Address	Geographical coordinates
Maybole Cattle Farm	Maybole Farm, Po Box 1723, Dundee, KZN	28°07'10.90" S 30°21'19.27" E
AFT Cattle and Sheep Farm	Glen Farm, Po Box 195, Dundee, KZN	28° 08' 28.01" S 30° 10' 52.92" E
Hofina Chicken Farm (A)	Meadowstrams sub 7, Newcastle KZN	27° 50' 46.21" S 29° 50' 08.31" E
Hofina Chicken Farm (B)	Farm Rust No 4282/4, Newcastle KZN	27°48'40.54" S 29°55'29.46" E
Eggbert Eggs and WDG Lelyveld (t/a Cleanwill Farming)	Po Box 37, Bloodriver, KZN, 3102	27°55'19.31" S 30°35'52.21" E

Table: Specification of farms within the project boundary

Indicate Emissions outside the Project Boundary	No emissions attributable to the project outside the project boundary was identified.

Location of the Project	
Province	Kwazulu Natal Province
Municipality	Umzinyathe District Municipality

Nearest city/large town	Dundee
Brief description of the location of the project site	Triple C Feedlot (Pty) Ltd approximately 13 km north-east of the city of Dundee. The GPs coordinates is 28°7'10.90"S and 30°21'19.27" E.

Project Schedule/Timetable	
Earliest Project Start Date	*2013/12(expected)*
When is the expected first year of CER delivery	*2014/06*
Project Lifetime	*20 years*
Project End Date	*2024/05*
Crediting Period	*10 years*
Current Status or phase of the project	The project is in technical design phase. The EIA has been completed and approved. The long term lease over agricultural land has been approved by the Department of Agriculture. NERSA gas activity registration is completed. Investors have been contacted and correlating steps are in progress in order to reach financial close.
DNA Approval	The project PDD has not been previously submitted to the DNA. The project's PIN was received by the Department on the 1st of December 2011.
Approval by other bodies	• NERSA: The project has been submitted unto NERSA ("National Energy Regulator of South Africa") for registration of a gas activity. Solek obtained approval from NERSA for the application in terms of gas activity registration under the Dundee Biogas Project registration. • PDA: The project has been submitted under the "Provincial Development Act" as required in KwaZulu-Natal. Presentation of the project to the executive committee took place on the 31st of May 2012. As part of the PDA requirements a number of South African government departments have been contacted such as the Department of Health, Transport, Land claims, Minerals and Energy. These departments have been asked to comment on the facility. The project team is awaiting feedback to the executive committee decision. • DAFF: The project has been submitted to the National Department of Forestry, Fisheries and Agriculture (DAFF). Consent for the use of agricultural land for Renewable Energy generation has been obtained. A second application to DAFF has been submitted for the approval of a lease over agricultural land for more than 10 years. The application has been approved by the committee, with formal approval being issued upon receipt of the ground resoning approval. The project is envisioned to reach financial close by July 2013, with the official starting date (as per UNFCCC definition) to be reached by December 2013.

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 contributes to national economic development by generating a much needed energy resource (electricity for the national grid). The generation, trading and consumption of this alternative and renewable energy stimulate development of local trade, job creation and enables supply of an important and competitive energy resource.

The project aims to generate some local jobs during construction and operation of the facility, with some added spin-offs towards the surrounding community during the time of construction and operations.

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

Skills development will form a central part of the project, which can contribute to local empowerment as well as future skills application in renewable energy. – Training will be implemented as a part of the CDM monitoring program.

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

The activities involved with the biogas digester does not trigger any listed activities in terms of either Regulation 544/545 (activities requiring Environmental Authorisation) of NEMA as no thresholds are exceeded and there are no associated activities requiring an application in terms of these regulations.

Cape Environmental Assessment Practitioners (Cape EAPrac) was appointed by the Applicant, Dundee Biogas Power (Pty) Ltd to develop an Environmental Management Programme (EMP) which will be used to promote and ensure environmental monitoring and control during all phases (construction, operation and possible decommissioning) of the proposed development of an Anaerobic Biogas Digester Plant on the Rem of 2 Maybole Farm 2419 near Dundee. Appendix G of the EIA.

The purpose of this EMP is to ensure that the environmental impacts of the various phases of the project on the environment are managed, mitigated and kept to a minimum.

i) That the **disturbance of ecosystems and loss of biological diversity** are avoided, or where they cannot be avoided, are minimised and remedied	The proposed area for construction has been identified as a high risk fire area and the utmost care will be taken to ensure that none of the construction activities result in wild fires. Please refer to EMP for details. Further disturbance of the ecosystem is avoided and minimised by following the developed EMP.
ii) That **pollution and degradation of the environment** are avoided, or where they cannot be altogether avoided, are minimised and remedied	Erosion is kept to a minimum, and topsoil is reused on other patched as part of the EMP.
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	No archeological studies have been undertaken for this proposal, however, as earthworks are proposed for the foundations of the Biogas Reactor, there is always the possibility of unearthing artifacts and / or remains. As a general principle, the legislation governing Heritage Resources will be followed. The Department of Heritage have been contacted (as requirement of the PDA), with

	no objections received.
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	Only approved waste disposal methods are allowed. Details of waste management is listed in the EMP.
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	Consumption of non-renewable resources is kept to a minimum as far as reasonably possible. The overall production of energy is more than the overall consumption of energy. The consumption of energy sources are minimized within the design and operation of the facility, where possible the produced energy is used to decrease the use of non-renewable energy. In fact the facility aims to generate surplus renewable energy.
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.	The facility is designed to maximize production of renewable energy. The lifetime and security of production is built on security of energy source supply (manure supply). By securing the input material, in the form of manure supply, the continued production of renewable sources are secured. The consumption of the produced renewable energy will be either to produce more electricity (heating of digesters) with less consumption of fossil fuel based electricity.
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	All design factors are based on worst case situations. Risks are identified and corresponding mitigation strategies are adopted within the design and operation of the facility. The knowledge transfer agreement and training of key personnel by the tried and tested technology providers reduce the risk of operational risks.
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	No negative impact has been identified at this stage. Detailed risk analysis as part of securing external investors requires risk mitigation strategies from an operational and design perspective.
Other comments Development of this project will aid sustainable development of renewable energy within the province and the country as anaerobic technology pose to be a widely proven technology with benefits on waste management, renewable energy generation, reducing environmental impacts and ultimately improving the surrounding area. The successful implementation of this project will aid the awareness of the technology and aid the adoption of this sustainable energy source within the province and country as a whole.	

Indicators in Support of the Project Approval Criteria			
Category		**Indicator**	**Comment**
Environmental	Impact on local environmental quality	• 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)	• The biogas plant will produce clean and renewable energy, which will feed into the national ESKOM electricity grid; Thus reduce pollution from fossil fuel generated power or gasoline. • Run-off from manure stockpiles will be eliminated; • The manure-based overflow from manure dams will be eliminated; • The hygienic conditions of the feedlot will be improved; • The nutrient-rich slurry (output of the bio-digester process) will be re-used as irrigation water with added nutrients/fertiliser; • Reduced greenhouse gas (methane and carbon dioxide) emissions and a reduction in the farm's carbon footprint.
	Change in usage of natural resources	• 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	• A portion of water consumed for irrigation will be used within the bigoas plant while the output will be used as nutrient rich slurry and add to the total irrigation water. No additional water is used for the facility than what is used for irrigation. • Utilisation of gas for electricity production will reduce the use of coal for electricity production.
	Impacts on biodiversity and ecosystems	• Changes in local or regional biodiversity arising from the project	• None

Indicators in Support of the Project Approval Criteria			
Category		**Indicator**	**Comment**
Economic	Economic impacts	• 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	The project aims to attain as much local procurement as possible, with a current approximated 25% CAPEX procured locally. The project procures a large percentage of the capital cost from Europe, therefore requiring foreign exchange for this amount. The project will have an impact on the local economic activity during construction with increased buying power within the surrounding area. The usage of local labor, contractors and consultants adds to investment within the surrounding local economy. The increased activity within the area will have a direct economic effect on the province. The project enables local production of energy. The production of energy on a local or decentralized location could enable surrounding users to obtain energy at a lowered cost than the current costs of the equivalent energy. Ultimately reducing the cost of electricity transfer losses for the utility. The project company does not obtain foreign assets through the project, hence little or no foreign investment impeding South Africa as an "Article 14 country" and the correlating prohibition of owning foreign assets or foreign exchange. The project requires investment from equity investors and debt investors. The investors for the project have not yet been secured. There exists a possibility that some of the investment funds may be invested via foreign investment houses or investors.
	Appropriate technology transfer	• 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	• Skills development will form a central part of the project, which can contribute to local empowerment as well as future skills application in renewable energy. • The project has great potential for replication and can be used for a variety of manure types. • The technology is planned to be imported from Germany and thus transfer knowledge of operation and technical value.

Indicators in Support of the Project Approval Criteria			
Category		**Indicator**	**Comment**
Social	Alignment with national provincial and local development priorities	• 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)	The project can utilize local labor for the construction of the facility where possible. The further operation of the facility can be done with local employees who will be trained to correctly operate the facility. The development of local expertise within renewable energy technologies are promoted through exposing different consultants to the project and the requirement of such projects. The experienced learning curve for the consulting firms will enable increased expertise in renewable energy and further expansion of these technologies within South Africa. The project will contribute to a minimum of five full time employees. With one to two (depending on the implemented model) employees being trained to act as facility managers, while approximately three employees will be employed under basic minimum wage employment of workers. The employment of these local residents will enable these families to sustain a livelihood while investing back into the surrounding communities. The project as a whole contributes to the national targets of obtaining renewable energy objectives as set-out by the South African Government in the promulgated IRP 2010 (40% of grid by 2030 from renewable energy) and significantly reduces the local reliance on fossil fuels, while promoting renewable energy and decreasing emission of greenhouse gasses.

Indicators in Support of the Project Approval Criteria			
Category		**Indicator**	**Comment**
	Social equity and poverty alleviation	• 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	<u>Part time and indirect employment:</u> • Project developers (2 full-time employees of Solek, 2 internship students) 4 people • EIA consultants (2 dedicated consultants, 3 consultants as required) 5 people • CDM registration (4 consultants contributed to the registration) 4 people • CDM validation (3 validators expected to contribute to validation) 3 people • Electrical connections (3 ESKOM employees) 3 people • Debt investors (estimated at 4 employees) 4 people • Equity investors (estimated at 3 employees) 3 people • Ground securing o Department of Agriculture (estimated 3 people) 3 people o Surveyor consultant and PDA applicant (estimated 3 people) 4 people • Geotechnical study (estimated 3 people) 3 people • NERSA application and approval (estimated 4 people) 4 people • Legal advice (estimated 4 people) 4 people • Site preparation consultants (estimated 4 people) 5 people • Construction (estimated 20 people) 20 people • Technology supplier (estimated 15 people) **Total indirect jobs impacted: 80 people** <u>Full time employment:</u> The project will contribute to a minimum of five full time employees. With one to two (depending on the implemented model) employees being trained to act as facility managers, while approximately three employees will be employed under basic minimum wage employment of workers. The employment of these local residents will enable these families to sustain a livelihood while investing back into the surrounding communities, previously underdeveloped. The project poses to be a flagship renewable energy project within the province, exposing society to a clean development mechanism and aiding social heritage – providing a clean tomorrow for the next generation.

Indicators in Support of the Project Approval Criteria			
Category		**Indicator**	**Comment**
General	General Project Acceptability	• Are the distributions of project benefits deemed to be reasonable and fair?	The costs involved with validation, performed by an accredited and registered DOE, is significant in relation to the initial investment cost. The size of a project needs to be sufficient in terms of CER generation in order to justify this cost. The benefits arising from the project enable the IRR to be increased to make the project more attractive towards investors, hence contributing to the feasible development of a project and attracting investment to the project. The project should attract several stakeholders such as debt and equity partners and also the developers of the project together with the farm owner. The scale of the project requires a fair distribution of benefits to each party in order to cover risk and make it an economically attractive investment opportunity.

Part D: Finance

Project Costs	
Development Costs (R's)	Year 0: First phase development cost R2 000 000 (estimated) Year 3: Second phase development cost R 1 000 000 (estimated)
Installed Costs (R's)	Year 0: First phase installed cost approximately R52 750 000 (estimated) Year 3: Second phase installed cost approximately R44 390 000 (estimated) additional to phase 1 cost.
Other Costs (R's)	Estimated running cost Y0: R3 000 000/annum, increasing with CPI Phase1. Estimated running cost Y3: R6 900 000/annum, increasing with CPI Phase2.
Total Project Costs (R's)	Phase 1 and Phase 2 combined total project cost of approximately R98 000 000 (present value).
Sources of Finance	
Equity	*Equity investors have not been secured up to date. Discussions underway with a number of potential investors. Currently considering a gearing ratio of 70:30.*
Debt (long term)	*Debt investors have not been secured up to date. Discussions underway with a number of potential investors. Currently considering a gearing ratio of 70:30.*
Debt (short term)	Solek as project developer is currently funding large parts of the project development costs. Solek have however obtained a partial matching grant for the project and further obtained a co-development agreement with the project carbon consultants.
Amount not identified (R's)	*Project overrun in terms of timelines adds constraints on the cashflow of the developer, but additional funding and grants assists significantly with continuation of the project development.*
Total CDM Contribution sought	CDM development costs and validation costs contribution would significantly assist with the registration of the facility as a CDM facility and CER generator. The estimated CDM development and registration cost is in excess of R 1 000 000 under registration and validation cost.
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 contract for purchase of the CERs has been secured at this stage, but expected price for CERs is modeled as 9,7 Euro/CER. The Crediting period is fixed at 10 years.
Indicate the **projected Internal Rate of Return** for the project with and without CER revenues.	*IRR of 8.9% without CER revenues taken into account.* *IRR of 11.4% with CER revenues.*
Constraints on tradability of carbon credits	*No constraining arrangements have been made.*
Preliminary discussions with potential purchasers	*No preliminary discussions with potential buyers were conducted, although an offer was received from a potential buyer. The offer was turned down due a low offered buying price/CER.*