PROJECT IDEA NOTE (PIN)

Name of Project: Cattle Manure Biogas Valorization Project at Golden Cream Dairy

Date submitted: April 2009

A. PROJECT DESCRIPTION, TYPE, LOCATION AND SCHEDULE

OBJECTIVE OF THE PROJECT *Describe in not more than 5 lines*	The objective of the project is to convert cattle manure into compost and biogas. Subsequently, convert biogas into heat and energy and recuperate the ultimate exhaust heat of the process to dry compost and the exhaust CO2 of the process to feed the growth of hydroponic tomatoes.
PROJECT DESCRIPTION AND PROPOSED ACTIVITIES *About ½ page*	The Farm is planning to host up to 3,000 dairy cows of the Holstein-Friesland and Jersey breeds. So far, only 500 heads have arrived at the farm which is still under development. Due to current space constraints, the facility will use the intensive dairy farming techniques used in most developed countries and will import about 60% of the food necessary to feed the stock. With time and if neighboring land acquisition is granted, the company will reduce that amount of imported products to 40% but the intensive farming techniques will still be used. The farm will start by producing pasteurized milk only. Once milk production increases and stabilizes at 30,000 liters per day, investment into the UHT treatment of milk will be made. Both pasteurization and UHT processes need heat that could be derived, if CDM developed, from the manure and waste water treatment plant. The farm's core business is milk, however, other secondary activities will also take place at the farm: - Composting and ensilage - Hydroponics vegetable cultivation - Processing of milk into high "value-added" products (yogurt, cream, butter, etc) - Energy generation (the farm will produce more energy than it needs and will therefore feed the grid) - Local cattle rearing and sale The CDM aspect of the project lies in the proper management of the effluent stream coming out of the stables. These effluents will be brought to 4 ponds where they will decompose and produce biogas in the absence of oxygen (anaerobic decomposition) in order to produce the dry compost. The biogas produced in the 4 ponds will then be fed into a flare and will eventually be used to produce electricity. The waste heat of the flaring OR electricity generation process will be used in the pasteurization process. The secondary waste heat will be used in drying the solid part of the wastewater treatment process in order to turn it into dry compost. **NOTE**: At this stage, the project promoter is not certain of the boundaries that he wants to put on the project. The scenarios are: - Dry composting without flaring vs dry composting with flaring - Dry composting without flaring vs. dry composting and heat recuperation for pasteurization - Dry composting without flaring vs. dry composting with electricity generation and heat recuperation. The promoter is well aware that in order to build the best case for CER, the

	project might have to only take the flaring into account. Also, at this stage, in the light of the important investments to be made for electricity, this is only a "potential project" even if the returns seem quite appealing on the basis of very limited information and assumptions.
TECHNOLOGY TO BE EMPLOYED[1] *Describe in not more than 5 lines*	Anaerobic water treatment in 4 parallel ponds producing biogas and compost. Brand water treatment plant: Not shared by promoter at this stage Supplier of energy making machines: same as above – waiting for info Other info on technology to be used in framework of CDM: same as above
TYPE OF PROJECT	
Greenhouse gases targeted $CO_2/CH_4/N_2O$/HFCs/PFCs/SF_6 *(mention what is applicable)*	CH4 and CO2
Type of activities Abatement/CO_2 sequestration	CH4 destruction by implementing proper waste water management scheme and CO2 avoidance by using the CH4 to produce renewable energy not needed to be provided by the grid.
Field of activities *(mention what is applicable)* *See annex 1 for examples*	4e. Waste water management and; 1b. Renewable energy from biogas
LOCATION OF THE PROJECT	
Country	Mauritius
City	Salazie
Brief description of the location of the project *No more than 3-5 lines*	Salazie is situated in the "Centre-North" part of the island, to the East of the Capital, Port Louis. The farm lies on 101 Arpents (40.4 hectares) and is situated to the South of the A2 and B19 roads that connect it to the rest of the island. In order for the project to increase its viability, it will have to spread and include new farmland to produce local food for the cows – this extra land extension is being negotiated with neighbour and Government.
PROJECT PARTICIPANT	
Name of the Project Participant	Golden Cream Dairy
Role of the Project Participant	a. Project Operator b. Owner of project c. Owner of the emission reductions d. Seller of the emission reductions e. Project advisor/consultant f. Project investor
Organizational category	a. Private company
Contact person	Errol Parker, Managing Director
Address	Lancaster Court, Port Louis, Mauritius
Telephone/Fax	Office phone: +230 208 65 13 Mobile phone: +230 790 60 61
E-mail and web address, if any	eparker@goldencream.mu
Main activities *Describe in not more than 5 lines*	Mr Parker owns and manages and range of companies in Mauritius. The main business activity was in Real Estate and now has evolved to "land development" – farms, commercial centres, etc.
Company profile	The Golden Cream Dairy Ltd had been registered by the Registrar of Companies on the 16th January 2008 (file number: 077021) as a Company in accordance with section 19 of the Companies Act 1984. The promoters comprise a consortium of Mauritians and South African investors that have been active in the farming industry in South Africa for generations. The main objective of the Company is to promote a more

[1] Please note that support can only be provided to projects that employ commercially available technology. It would be useful to provide a few examples of where the proposed technology has been employed.

	sophisticated, technology-based approach to dairy farming with the focus of contributing in our national milk production in order to attain self-sufficiency, and at the same time meeting milk quality exigencies, food safety and also promoting entrepreneurship in the dairy sector. The promoters will retain the services of highly experienced dairy technicians from South Africa who have been very successful in rearing Jersey Dairy stock of high production potential. The farm will be designed, constructed and run along modern production methods and rely on high end technological and management inputs. The equipment and technology will be imported from De Laval Company and Global separation. Designs for building that satisfy tropical conditions and draw on experience from South Africa will be used. The Farm manager, in charge of the dairy farm, has the necessary expertise in breeding, animal husbandry, waste management, milk production, growing and harvesting of fodders, mixing of feeds or making of silage. A full time veterinary officer will be employed to take care of the health of the animals.
EXPECTED SCHEDULE	
Earliest project start date *Year in which the plant/project activity will be operational*	As soon as carbon financing is secured, 3-6 months to implement technology on site.
Estimate of time required before becoming operational after approval of the PIN	3-6 months
Expected first year of CER/ERU/VERs delivery	One year after implementation – 2011 tentative date.
Project lifetime *Number of years*	Ongoing
For CDM projects: Expected Crediting Period *7 years twice renewable or 10 years fixed*	10 year fixed period
Current status or phase of the project	❖ Finishing the building of main farm's facilities ❖ CDM aspect is being studied and plans are drawn – no security whether CDM project will go ahead or not at present time.
Current status of acceptance of the Host Country	❖ No formal contact with DNA as of now
The position of the Host Country with regard to the Kyoto Protocol	The Host Country acceded to the Kyoto Protocol in 2001 The Host Country has established a CDM Designated National Authority in 2005 – The Ministry of Environment

B. METHODOLOGY AND ADDITIONALITY

ESTIMATE OF GREENHOUSE GASES ABATED/ CO_2 SEQUESTERED *In metric tons of CO_2-equivalent, please attach calculations*	Once project fully operational with 3,000 heads, it is estimated that the project will generate: ❖ **12,000 tCO2e per year** from methane capture and destruction ❖ If electricity is generated: **7,500 tCO2e per year** that will not need to be fed by the grid and exported ❖ A third potential CER generator of **1,491 tCO2e** from heat recuperation for pasteurization and/or UHT process (fuel

	reduction) –probably not covered in methodology. In total, per year, an estimated: **19,500 (20,941 with heat recuperation) tCO2e per year** From 2011-2012 (**3 years**): **39,000 tCO2e (or 41,882 with heat recup)** Over **10 years** crediting period: **195,000 tCO2e (or 209,410 with heat recup)**
BASELINE SCENARIO *About ¼ - ½ page*	The project will reduce the emission of methane that would have otherwise occurred by the anaerobic decomposition of manure in the farm's pond. Furthermore, fuel (diesel) would have been used to generate the heat necessary to pasteurize the milk production and electricity would have been sourced from the grid (lowest upfront investment cost option). There are no other farms alike in Mauritius at present time – only small cooperatives and semi-intensive farming. No aerobic water treatment plants are used there. No anaerobic water treatment plant (with biogas recuperation and destruction) is being used in those cooperative farms either.
ADDITIONALITY Please explain which additionality arguments apply to the project:	❖ No regulation forcing the farm to use more costly anaerobic ponds (or aerobic) and destroy methane (or manage biogas) ❖ Up front investment would be lower if the farm goes for the baseline option – however, with time, the farm benefits from lower operational costs (electricity and free heat)
SECTOR BACKGROUND	Milk production is, currently and exclusively carried out by small farmers operating on a low input-low output system of production. Milk production has declined significantly over the last twenty years on account of a number of constraints: 1. Rigid public health and environmental legislation 2. Removal of former incentives or subsidies 3. Non-availability of breeding stock and high price of breeding stock. 4. Better remunerated jobs in other sectors such as industry, tourism, service and etc., 5. Low replacement of aging cow keepers as cow keeping is looked upon socially as a low class activity and there is a the lack of interest of the younger generation to take over this activity. 6. Dairy farming is unduly labour intensive. 7. The part-time nature of this activity and the lack of professional management at smallholder level. Moreover, the overall system in terms of production, collection, quality, processing and marketing is fraught with difficulties. 8. Scarcity of forage due to heavy use of herbicides and increasing urbanization. 9. Low adoption of technology at farm level (archaic mode of production from small farmers). 10. The low milk yield of the local breed It seems inevitable that the number of smallholders will decline still further. All these factors have brought increasing pressure on smallholders in built-up rural areas causing a gradual abandonment of this activity. The annual fresh milk production has decreased from 5 million to 3.5 million litres. This represents only 2.2% of the total consumption. Mauritius imports a very large amount of dairy and other livestock products to meet national requirements. Local production of fresh milk and beef has declined to less than 5% of our

	requirements, and the country is heavily dependent on imports at considerable expense in terms of foreign exchange. Imports of milk and milk products amount to Rs 2 billion annually. The annual demand for fresh milk and milk products are expected to keep rising. On the international level, the price of milk has increased appreciably and this trend is expected to continue.
METHODOLOGY	This project is covered by an existing Approved CDM Small-Scale Methodology. Applicable methodology: **AMS III.D./Version 15: "*Methane recovery in animal manure management systems"*** Possibly in combination with the AMS.I.D version 15 if the opportunity for including the component on grid connected electricity generation is pursued.

C. FINANCE

TOTAL CAPITAL COST ESTIMATE (PRE-OPERATIONAL)	
Flaring of gas issued from compost activity only – Scenario 1	
Development costs	Already included in the baseline US$ million (Feasibility studies, resource studies, etc.)
Installed costs	0.410 US$ million (Property plant, equipment, etc.)
Land	Already included in baseline US$ million
Other costs (please specify)	undefined yet US$ million (Legal, consulting, etc.)
Flaring of gaz, heat recuperation and electricity generation – Scenario 2	
Development costs	Already included in baseline
Installed costs	1.81US$ million (Property plant, equipment, etc.)
Land	Already included in baseline
Other costs (please specify)	Undefined yet US$ million (Legal, consulting, etc.)
Equity Name of the organizations, status of financing agreements and finance (in US$ million)	None
Debt – Long-term Name of the organizations, status of financing agreements and finance (in US$ million)	All scenarios will be debt financed either by current lenders or other financial institutions – no more information could be gathered, at this stage, from the promoter on debt financing
Debt – Short term Name of the organizations, status of financing agreements and finance (in US$ million)	None – only long term needed
Carbon finance advance payments[2] sought from the World Bank carbon funds.	No carbon finance was sought from the World Bank
SOURCES OF CARBON FINANCE Name of carbon financiers other than any of the World Bank	None at this stage

[2] Advance payment subject to appropriate guarantees may be considered.

carbon funds that your are contacting (if any)	
INDICATIVE CER/ERU/VER PRICE PER tCO_2e[3] *Price is subject to negotiation. Please indicate VER or CER preference if known.*[4]	10 Euro pre and post 2012 ideally sought – price to be negociated
TOTAL EMISSION REDUCTION PURCHASE AGREEMENT (ERPA) VALUE	
A period until 2012 (end of the first commitment period)	To be negotiated US$ / €
A period of 10 years	To be negotiated US$ / €
A period of 7 years	To be negotiated US$ / €
Financial analysis of all scenarios provided in attached XL spreadsheet.	

D. EXPECTED ENVIRONMENTAL AND SOCIAL BENEFITS

LOCAL BENEFITS E.g. impacts on local air, water and other pollution.	Recuperating the biogas in inflatable tents and flaring it will have a very good impact on air quality. At present, the water decantation system does not have to be closed and gas treated which means that the smell from sulfur and ammonia will be released. The overall project will treat the water and reuse it for irrigation instead of discharging it in an "uncontrolled" way. This reuse of water is in line with a sustainable development way of using natural resources. Dry compost of good quality will enable the soil to receive natural fertilizers.
GLOBAL BENEFITS Describe if other global benefits than greenhouse gas emission reductions can be attributed to the project.	Mauritius, by having a local milk production facility is working towards food safety and eventually independence. Being a small island state with an economy turned towards export of agricultural products is a threat if the island ever gets "disconnected" from supply source and market. There is a growing worldwide awareness on the benefits of drinking fresh milk, which contains complex health promoting substances. Recently, drinking milk, especially the reduced fat type, has been shown to be effective in achieving weight loss for people who are overweight or obese. On the other hand, regular consumption of powdered milk especially by children could lead to diabetes which in Mauritius impacts 1 out of 5 citizen (20% of the population has diabetes).
SOCIO-ECONOMIC ASPECTS	
What social and economic effects can be attributed to the project	• The whole of the population will benefit from access to fresh milk at affordable price – instead of having to drink powdered milk which,

[3] Please also use this figure as the carbon price in the PIN Financial Analysis Model (cell C94).

[4] The World Bank Carbon Finance Unit encourages the seller to make an informed decision based on sufficient understanding of the relative risks and price trade-offs of selling VERs vs. CERs. In VER contracts, buyers assume all carbon-specific risks described above, and payment is made once the ERs are verified by the UN-accredited verifier. In CER/ERU contracts, the seller usually assumes a larger component - if not all – of the carbon risks. In such contracts, payment is typically being made upon delivery of the CER/ERU. For more information about Pricing and Risk, see "Risk and Pricing in CDM/JI Market, and Implications on Bank Pricing Guidelines for Emission Reductions".

and which would not have occurred in a comparable situation without that project? Indicate the communities and the number of people that will benefit from this project. *About ¼ page*	when badly dosed either causes nutritional deficiencies (too little) or diabetes (too much) • Proper landscaping and embellishment will be carried out on the site to enhance the environment and all possible mitigation measures will be taken in order to minimize any negative impact of the operation – please note that this is a non residential and on inhabited region.
What are the possible direct effects (e.g. employment creation, provision of capital required, foreign exchange effects)? *About ¼ page*	• Considering the high volume of dairy imports and in view of the fact that the local milk production is not being optimised, the promoter, through this project, is willing to take advantage of the measures as proposed in Strategic Options in Crop Diversification and Livestock Sector (2007-2015) and contribute to the national economy through production of milk and other milk products, breeding and fattening animals. This will lead to saving of foreign exchange and generation of employment. • The non importation of milk in powdered form will reduce the amount of foreign currencies leaving the country – good for the balance of trade. • Foreign capital will be invested in the country from South Africa in partnership with local entrepreneurs – Foreign Direct Investment of 100 million rupees – about 3.3 million USD.
What are the possible other effects (e.g. training/education associated with the introduction of new processes, technologies and products and/or the effects of a project on other industries)? *About ¼ page*	• The team of employees will be trained for optimising output and operate in a very safe environment with proper motivation. Employment will also be created for 4 persons. • The project will produce animals for smaller farmers to start producing fresh milk around the island and the area of Salazie – the milk can be sold as such to households that will pasteurize it themselves or to a large farm like Dairy Cream's in Salazie. • The introduction of a large dairy farm will enable other industries to benefit form fresh local milk production: yogurt, ice creams, cream, cheese, etc production could be boosted. • The farm is built so as to maximize natural cooling of the shed – use of wind direction and best building practices in the industry (something new in Mauritius).
ENVIRONMENTAL STRATEGY/ PRIORITIES OF THE HOST COUNTRY A brief description of the project's consistency with the environmental strategy and priorities of the Host Country *About ¼ page*	Rocketing oil price in 2008 has participated in the development of a food crisis through the rise in freight and production costs around the world. Demand for food, at the time, was increasing and small economies like Mauritius realized the importance of increasing their level of "food security". This has become one of the main policies of the current Government – rebuild the islands agricultural landscape by diversifying the sector away from the export oriented "sugar cane mono-crop". This project is fully in line with the short, medium and long term sustainable development policies of the country.