

**CDM
Project Idea Note**

**Bioelectricity from food withdrawals,
Casablanca, Morocco
TrusTime, Ltd.**

Confidential

Name of Project: *Bioelectricity from food withdrawals, Casablanca, Morocco*

Date submitted: 25/11/2009

A. Project Participants

Project proponent	
Name of the project proponent	TrusTime, Ltd
Organizational category	Private company
Legal status	Limited liability company
Role of the Project proponent	Owner and developer of the project
Street Address	Mira st, 3A-21, Sergiev Posad, Moscow region, Russia, 141300
Contact person	Kirill Batigin
Telephone / fax	Tel: +7 917 931 3495, Fax: +7 843 523 1748
E-mail	kirbatigi@aol.com
Main activities	<i>Logistics, Transportations, Industrial design and construction</i>
Summary of financial performance in last fiscal year	Total assets: 35,000 Euro Revenues: 1,708,530 Euro
Other Project participants, if applicable	
Name of the project participant	Casablanca municipality
Organizational category	Municipality
Legal status	
Role of the Project Participant	Owner of the site or project
Street Address (include web address, if any)	Address, PO Box, City, Country
Contact person	
Telephone / fax	
E-mail	
Main activities	
Summary of financial performance in last fiscal year	

B. Project Summary: Type, Location, Description, and Schedule

Type of the project	
Greenhouse gases (GHG) targeted	CH ₄
Type of activity	Biomass recycling to energy (Electricity)
Location of the project	
Region	North Africa
City, Country	Casablanca, Morocco
Brief description of the plant or facility site	<p>Collected and sorted biomass recycling to biogas that using in co-generator to produce electric power and heat. Electricity is supply to the grid and heat is returns to the plant for the fermentation process.</p> <p>Other part of the plant runs is fertilizer.</p> <p>Numbers: From 1 ton of biomass we can obtain:</p> <ul style="list-style-type: none"> - Electricity = 320 kWh - Heat = 375 kW - Fertilizer - 0,75 ton <p>Employment - 25 (3-plant site, 20-transportation, 2-administrative).</p>
Project details	
Project description and proposed activities (including a technical description of the project) and technology to be employed.	<p>Scope</p> <p>The project purpose is CO₄ reduction using the anaerobic process. How we can reach it?</p> <p>Morocco obtains 95% of electricity burning oil and coal. It is not environment friendly process. Constructing the bioelectricity plant we can reduce GHG emissions. Whole amount of the food waste from every hotel, restaurant and household we are collect and transports by <u>own delivery service</u> to the plant to recycle to electricity, which will be supply to the national grid for the lower cost.</p> <p>Also with the help of anaerobic digestion technology we can produce organic fertilizer containing biologically active substances and micro elements.</p> <p>Technology peculiarities and working principle</p> <p>Food wastes after sorting at MSW sorting plant have some distinctive features in comparison with other organic wastes:</p> <ol style="list-style-type: none"> 1. Presence of inorganic compounds in 15% quantity from total volume of waste. 2. Morphology and fraction size. <p>That is why food waste are recycled using special two stage technology. The peculiarity is in preparation stage of food waste. After sorting food waste of different fraction size transported to mechanical disintegration unit. Produced homogenous mass containing inorganic and mineral compounds directed to inorganic detachment stage.</p> <p>Inorganic materials detachment (with density lower than water) is performed with the help of hydraulic sedimentation in special tanks. Inorganic parts with density less than 800 kg/m³ come to upper layer and removed by special device. Neutralization of water solution from bacteria and viruses is made in tube sterilization unit during 1 hour at 70°C.</p> <p>Using pipe water solution is transported to closed tank which serves as accumulation vessel for sterilization. From that tank water is fed into the tube sterilization device equipped with heat exchanger at inlet stage.</p> <p style="text-align: right;"><i>(to be continued on the next page)</i></p>

<p><i>Project description and proposed activities (including a technical description of the project) and technology to be employed. (Continue)</i></p>	<p>Water heating is made by heat exchanger and kept in tubes for a required period of time. In that way water solution is circulated for in hour in a closed circle consisting of accumulation vessel – pump – sterilization unit. During the heating in tank water solution density decreases to 850 kg/m³ that makes inorganic particles detachment with higher density more effective. In order to perform this process water flow is changed at an angle 90 degrees hence accumulating small heavy at the tank bottom. These particles are discharged with the help of screw discharger that is installed at the bottom of the tank.</p> <p>Prepared water solution of organic substances acquires quality of nutrient substrate for bacteria. After sterilization stage substrate pumped to hydrolysis reactor for 8-10 days retention time. In hydrolysis reactor special temperature conditions secured, the humidity is increased and pH level is carefully controlled. From the hydrolysis reactor substrate is supplied in doses to digester, that is very significant factor for bacterial balance preservation. Biogas accumulated in outer bag gas holders made of strong and tensile material. The main condition for digestion is substrate temperature 25-28 Co and complete mixing. That is why tank reactor is equipped with wall heating system and mechanical mixing system.</p> <p>Substrate contains simple alcohols and acetate, which are soluble in water. Produced substrate loaded under the pressure to digester where final 30 days stage of waste recycling into biogas and organic fertilizer takes place.</p> <p>Required conditions for digestion are constant temperature of substrate in the range of 36-38 Co, even and proportional substrate loading within whole digester square. Substrate supply to digester is made 8-12 times per day in a program time mode with the help of pump.</p> <p>Digester is a gas proof and hermetically sealed tank made of reinforced concrete. In order to maintain even temperature its internal side equipped with bottom and walls heating system. Such system passes through compulsory hydraulic testing. In order to prevent heat losses the outer side of digesters walls insulated. Mechanical mixer is inside the digester and ensures complete and careful mixing. Fermented biomass discharge takes place with the same periodic as loading. Biogas plant control is made by central program module in a time-programmed mode in accordance with limit sensors values.</p> <p>Produced biogas collected to the gasholder. Gasholder is can be used as gas proof cover of the digester and execute the function of gas storage orto be performed as a outer bag gasholder. Gasholder membrane is ultraviolet and ozone resistant and has low throughput of biogas. The gasholder material is resistant to fire and is very tensile. Gas extraction is made by pipeline, which equipped with automatic condensate discharge unit and safety devices which secure gasholder from excess pressure. All devices work on limit sensors data. From the gasholder biogas is continuously fed to the co-generation unit or biogas treatment system. Digested biomass directed to separation unit. Mechanical separation unit works 8-12 times per day in a time-programmed mode and detaches digested biomass to solid and liquid fertilizer.</p> <p>Solid fertilizer transported by loader and liquid fraction is pumped by pipeline to lagoon for storage Solid fertilizer can be applied to the own fields or dried, packed and sold.</p>
<p>Examples of technology has already been employed</p>	<p>http://zorg-biogas.com/references <i>Our plant is the same, but working on food waste +co-generator 13MWh</i></p>
<p>Contact details of the technology provider (producers, vendors)</p>	<p>www.zorg-biogas.com</p>

Business Rationale & Commercial Strategy	TrusTime Ltd. will establish the company in Morocco to operate this project to prepare PDD, plant constructing and to plant operate. We're assume to get the general profit from the waste collecting and transportation, electricity and fertilizer sell and up to 7 years close the debt.
Capability in implementing the project and management	TrusTime Ltd. - monitoring and PDD development ZORG company - design, technological constructing and plant erection TrusTime Ltd. - Shipment of the plant parts to Morocco and plant building Municipality of Casablanca - juridical providing **/ TrusTime team consists of jurist, scientist, bio technology, ecology, builder and design specialists, which has experience with operating technology
Sector Background	
General sector structure and organization	General users of electricity - householders, commercial and hotels, which consumes electric power from oil&coal burning electric power stations. The current situation is not well cause of unenvironmental process. Electric power is supplied to the grid.
Relevant governmental policies	1. Evaluation of the village waste alternative 2. Development of integrated waste management 3. Expand waste recycling projects to maximize their benefit
Expected schedule	
Current status or phase of the project	Project planning
Earliest project start date	October 2010
Estimate of time required before becoming operational	Month & Year of expected financial closure: JAN, 2011 Month & Year for completing legal matters: MAR, 2010 Month & Year in which negotiations will be completed: FEB-MAR, 2010 Month & Year in which construction will be completed: DEC, 2010
Next major steps toward design and financial closure and expected dates of concluding these steps	N/A
Project lifetime (no. of years)	7 years
Proposed crediting period for the project (no. of years)	10 years

C. Financial Details

Total project costs estimate (Please provide a breakdown and/or explanation where appropriate)	
Development cost	€500,000
Installed project cost	€29,355,000
Other costs	€400,000
Total project cost	€30,255,000
Sources of finance identified (Please provide a breakdown and brief summary where appropriate)	
Equity	Names and amounts by provider in € or \$
Debt - Long term	€30,255,000
Debt - Short term	Names and amounts by provider € or \$
Contribution of direct local beneficiaries (if applicable)	
Not yet identified	N/A
Expected financial returns	€ 718,000 - Collect and transportation of the waste (per year) € 3,240,000 - Electricity sell (per year) € 5,171,040 - Fertilizer sell (per year)
Is ODA involved in project financing?	No
Impact of CDM contribution	This project allow to reduce GHG emissions in Morocco for 51,442 tCO ₂ e per annum by biogas electricity power station construction and reduce oil and coal burning.
Economic viability	Assume a CER price of € 10/t CO ₂ e IRR without CER: 22,84% IRR with CER: 25,15%

C. Expected benefits for sustainable development

Estimate of Greenhouse Gases abated (in tonnes of CO ₂ -equivalents)	Annual: 51,442 tCO ₂ e/year Up to a period of 10 years: 514,420 tCO ₂ e
Baseline scenario/analysis	CDM projects must result in GHG emissions being lower than "business-as-usual" in the Host Country. Please indicate briefly: <ul style="list-style-type: none"> How would the future look without the proposed CDM project? N/A What would the estimated total GHG emissions be? N/A
Effects of the project regarding local/regional/global environment	Air quality (emission other than GHGs) Availability of renewable sources
Effects of the project regarding Social and economic aspects	Employment Low cost electricity for habitants New environmental education New, low cost fertilizer for agriculture and forestation
Effects of the project regarding technological development	Size of installations - 13,2MWh electric power installed Development and transfer of technology and know-how Infrastructure (construction)
Stakeholder Consultation	N/A