

Mini - Project Idea Note

Generic Name of Project: *Palm Oil Company (POC) #2: Energy System Optimization and Cogeneration Plant Project*

Date submitted: *21st April 2007*

Technical summary of the project	
Greenhouse gases targeted	<input checked="" type="checkbox"/> CO ₂ / <input checked="" type="checkbox"/> CH ₄ / <input type="checkbox"/> N ₂ O / <input type="checkbox"/> HFCs / <input type="checkbox"/> PFCs / <input type="checkbox"/> SF ₆
Field of activities	<input checked="" type="checkbox"/> a. Energy supply <input checked="" type="checkbox"/> b. Energy demand <input type="checkbox"/> c. Transport <input checked="" type="checkbox"/> d. Waste management <input type="checkbox"/> d. Manufacturing industries <input type="checkbox"/> e. Chemical industries <input type="checkbox"/> f. Mining/mineral industries <input type="checkbox"/> g. Fugitive emissions from fuels (solid, oil, gas) <input type="checkbox"/> h. Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride <input type="checkbox"/> i. Solvent use <input type="checkbox"/> j. Agriculture and livestock
Objective of the project	<p>The objectives of the project are:</p> <p>(1) To reduce CH₄ emissions from uncontrolled burning or decay of palm oil empty fruit bunch (EFB) in open-air environment by utilizing EFB as fuel in the modified existing boiler to produce steam for the palm oil milling process; and,</p> <p>(2) To reduce CO₂ emissions from grid electricity generation by using palm fiber more efficiently for power generation to supply electricity to the National grid; and,</p> <p>To avoid CH₄ emissions from wastewater digestion in existing open ponds system and to abate CO₂ emissions of grid electricity from using biogas as fuel in the internal combustion engine that will supply electricity to grid.</p>
Project description and proposed activities	<p><i>Palm Oil Company (POC) #2</i> is a crude palm oil (CPO) mill, which has been operated since 1987. <i>Palm Oil Company (POC) #2</i> would like to fully utilize energy from their palm oil residues and biogas system by planning to modify and optimize their energy generating/utilization units as follows:</p> <p>1) Modifications of the existing boiler (Boiler No. 1) for using EFB as fuel</p> <p>The boiler No.1 (capacity of <i>15 ton-steam/hour</i>) is currently used as a spare boiler to the boiler No.2, which both use palm fiber as fuel. This boiler No.1 shall be modified by equipping new combustion system, economizer, and others to have higher boiler efficiency and to be able to burn EFB as fuel that would otherwise have been left to decay in the open-air environment. The boiler</p>

	<p>plant will generate steam to serve all steam (heat energy) needs for palm oil mill processing (excluding hot water). The amount of EFB shall be used by the project activity is approximately <i>39,751 tons per year</i>.</p> <p>2) Modifications of the boiler No.2 and Installation of new steam turbines The boiler No.2 (capacity of <i>30 ton-steam/hour</i>), which is currently used for supply steam to palm oil mill process, shall be modified to have higher boiler efficiency. New combustion system, economizer, condensing steam turbine-generator, and others shall be employed to burn palm fiber more efficiently. Steam produced from the boiler shall be used to generate electricity for factory use and export surplus electricity to the grid under the Very Small Power Producer (VSPP) program, while some amount of steam shall be used to generate hot water to serve for palm oil mill process as cogeneration. The net power output exporting to the grid, shall be approximately <i>2.08 MW-net</i> or <i>9,172 MWh per year</i>.</p> <p>3) Full biogas utilization by biogas plant expansion and high efficient gas engines installation At present, wastewater effluent from <i>Palm Oil Company (POC) #2</i> mill consists approximately in 40% of the total amount of the <i>480 m³/day</i> which is treated by the existing biogas system, namely: "<i>Complete Stirred Tank Reactor (CSTR)</i>". The remaining 60% of total wastewater amount is treated in open lagoons system. The current CSTR can treat wastewater, and produce a quantity of biogas of approximately <i>4,000 Nm³/day</i> (@ 65% CH₄).</p> <p>To fully utilize the energy from the biogas potential, POC shall construct a new advance covered lagoon digester, to treat all excess of palm oil mill wastewater effluent (POME), which now is treated in open lagoons. Additional amount of biogas production of approximately <i>6,600 Nm³/day</i> (@ 65% CH₄) shall be fed to the new biogas internal combustion engine, which will generate an amount of electric power of <i>0.66 MW-net</i> or <i>2,921 MWh per year</i> for exporting to the grid.</p>
<p>Technology to be employed</p>	<p>The technologies to be employed in this project comprise:</p> <ul style="list-style-type: none"> (1) Biomass (EFB) boiler, to utilize EFB as fuel for producing steam supply to palm oil mill; (2) Biomass (palm fiber) thermal-steam cycle power plant; and <p>Wastewater treatment plant with biogas engine generator, to generate electricity supply to grid.</p>
<p>Location of the project</p> <p>Brief description of the location of the project (Region and Country were the project will be</p>	<p>The project is located in Krabi Province, Thailand.</p>

implemented	
Expected environmental and social benefits	
Estimate of Greenhouse Gases abated (in metric tons of CO ₂ -equivalent)	The potential GHG-emission reduction is approximately <i>20,776 tCO₂-equivalent/year</i> , or <i>311,636 tCO₂-equivalent</i> for project duration (estimated at <i>15 years</i>).
Socio-economic aspects What social and economic effects can be attributed to the project and which would not have occurred in a comparable situation without that project?	<p>The project activity will contribute to the sustainable development of Thailand in following ways:</p> <ul style="list-style-type: none"> • The energy utilization of palm oil factory shall become more efficient and stable. Most crude palm oil mills in Thailand which now do not supply electricity to the grid and do not use EFB as fuel could use POC's example for implementing this kind of project, which will increase the overall efficiency of the palm oil mill industries in Thailand; • Enhance Thailand's industry productivity, through more efficient use of abundant agricultural residues such as palm fiber, palm shell, and empty fruit bunch, and also more efficient way of energy use for production; • The utilised biogas will reduce methane emission and thus decrease the impact on the global warming; • Support Thailand's policy towards renewable energy, which includes the promotion of biomass/biogas as fuel for power generation; • Reduce the country's dependence on the use of fossil fuel in power generation, which now is dominated by natural gas, lignite and imported fuel oil; • The problem of bad odors and insects caused by the wastewater digestion in open lagoons and EFB decay in environment will be reduced; • Increase local employment; and, Improve stability of electricity supply in the local area.
PIN/PDD Developer-Intermediary	
Name of the PIN/PDD Developer	<p>Dr. Thierry LEFEVRE, Managing Director Energy Economy Environment Consultants Co. Ltd. SLD Building (7B), 13 Soi Saladaeng 1, Rama IV Road, Silom Sub-district, Bangrak, Bangkok 10500, Thailand Tel: (662) 235-5817, (662).629.0912 Fax: (66 2) 236-9574</p>
E-mail and web address, if any	t.lefevre@eeec.co.th or t.lefevre@ceerd.net
Expected schedule	
Earliest project start date	By <i>2007</i>
Expected first year of CER delivery	<i>2008</i>
Project lifetime	<i>15 years</i>
Current status or phase of	<input type="checkbox"/> Identification and pre-selection phase

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the project	<ul style="list-style-type: none"><input type="checkbox"/> Opportunity study finished<input type="checkbox"/> Pre-feasibility study finished<input checked="" type="checkbox"/> Feasibility study finalized<input checked="" type="checkbox"/> Negotiations phase<input type="checkbox"/> Contracting phase (mention what contracts)<input type="checkbox"/> etc.
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