

13.- A low cost anaerobic treatment in a covered lagoon system

Title and name of product or technology										
Low-cost anaerobic wastewater treatment with energy recovery and emission reduction										
Abstract										
<p>Technology represented by a range of innovative products consisting of know-how, detailed designs and constructions for anaerobic treatment of organic waste streams (wastewater or slurries such as manure) in an engineered covered lagoon system. The advantages of anaerobic digestion are production of energy rich biogas, emission reductions, environmental pollution control, production of valuable byproducts and sanitation.</p> <p>The Ecofys Anaerobic Lagoon technology has similar or better performance in comparison with commonly used technology, which is tank-based. However the main advantage of the lagoon-based technology is a dramatic reduction of capital investment, in some cases savings of up to 80% in comparison with conventional technology can be achieved. For some of the innovative products patent applications have been filed.</p>										
Description including main features/advantages										
<p>The technology is represented by a range of products which consist of innovative technology products for lagoon-based anaerobic treatment of wastewater and slurries. The innovative aspects are represented as know-how and detailed engineering designs. For part of these products patent applications have been filed.</p> <p>Anaerobic treatment is a biological process during which organic matter is converted into energy-rich biogas. The commonly accepted practice by the use of tanks in which anaerobic bacteria are mixed with wastewater or slurries such as for instance manure. Tanks, being constructed of steel or concrete are expensive and especially for very large biogas plants treating large waste streams such as palm oil mill effluent, tapioca starch processing waste, ethanol vinasse or sewage (to name a few) the cost of tank construction may become prohibitive for the investment to go ahead.</p>										
Innovative aspects										
<p>This technology is based on the use of low-cost plastic films to engineer lagoon digesters. The plastic is used to:</p> <ul style="list-style-type: none"> • Collect biogas • Retain the bacteria in the lagoon • Prevent leakages to ground water • Many other innovative functions <p>For instance the innovative PCL-UASB technology replaces concrete and load-bearing heavy steel constructions in conventional technology by plastic membrane sheets suspended by floats, weights and low-cost cables inside lagoon systems.</p>										
Current and potential industrial users/domains of application										
<p>This has led to the development of the following products which are near market ready:</p> <table border="0"> <tr> <td>CHEAP™</td> <td>Tapioca Starch, Ethanol Distillery Waste, other waste streams</td> </tr> <tr> <td>MEP</td> <td>Palm Oil Mill Effluent</td> </tr> <tr> <td>PCL</td> <td>Palm Oil Mill Effluent (patent pending)</td> </tr> <tr> <td>PCL-UASB</td> <td>Ethanol Vinasse, Sewage (patent pending)</td> </tr> <tr> <td>CHEAP™-Solids</td> <td>High solids waste streams, Manure, Slurries</td> </tr> </table> <p>PCL-UASB in particular is set to become one of the most innovative products as it allows anaerobic treatment of dilute wastewater streams (such as domestic wastewater) in metropolitan settings in tropical countries, thereby dramatically reducing</p>	CHEAP™	Tapioca Starch, Ethanol Distillery Waste, other waste streams	MEP	Palm Oil Mill Effluent	PCL	Palm Oil Mill Effluent (patent pending)	PCL-UASB	Ethanol Vinasse, Sewage (patent pending)	CHEAP™-Solids	High solids waste streams, Manure, Slurries
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or eliminating negative environmental and sanitary impact of discharge of domestic sewage, generating large bioenergy potential and dramatic reduction of uncontrolled emissions caused by degradation of sewage in open waterways.

Other applications for PCL-UASB are industrial waste streams such as beer, winery, fruit and vegetable processing, sugar, starch processing and ethanol distillery effluents.

Current state of development

Some of the mentioned products are ready for design and construction for commercial plants, others such as PCL-UASB are in need for semi-technical scale piloting to establish the most (cost) effective methods of construction

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