

Anaerobic Digestion in the Palm Oil Sector

In anaerobic digestion, bacteria decompose organic matter in the absence of oxygen, producing the energy necessary for their metabolism. Methane and carbon dioxide — a mixture commonly called “biogas” — are byproducts of this activity. Biogas is combustible and can be used for energy. An anaerobic digester is a specially engineered bioreactor with conditions suitable for anaerobic digestion and the relevant natural microorganisms.

Palm oil mills generate high-strength wastewater, conventionally treated in open ponds where anaerobic conditions exist. These ponds release biogas, including the greenhouse gas methane, to the atmosphere. An anaerobic digester recovers the biogas, while maintaining the effluent within a controlled environment typically smaller than the original ponds. The biogas can be used for energy, while the water can be used for irrigation or brought to safe, legal discharge limits. The digestion process also produces a sludge (digestate) containing most of the nutrients (N,P,K) originally present in the organic material. This can be either land applied alone or used with the treated effluent water as a fertilizer. If the digestate is separated from water, it can be stored for controlled application after total or partial drying.

Cargill utilizes anaerobic digestion in its own plant operations and will use this competency, along with our technical partners, to design the best solution for your operation. Flexibility in custom solution design is a hallmark of our operations.

A digester offers operational and environmental benefits, and can prepare your operation for increasingly demanding standards of sustainability and environmental stewardship.

Key benefits include:

- ☼ Biogas as fuel for heat and/or power generation.
- ☼ Odor reduction.
- ☼ Reduced treatment pond area.
- ☼ Consistency of discharged wastewater quality, making the treatment system suitable for certification.
- ☼ Optimized land application of water and nutrients.

Cargill Environmental Finance

Improving the environmental condition.™

What Cargill Environmental Finance Can Offer the POME Sector

Cargill will finance, build, own, and operate the digester for a period of time, which varies depending on the individual economics of each project. In the past, this period has averaged 10 years. In exchange, your palm oil operation will receive:

- ☼ Performance assurance of waste water treatment and improved ease of environmental compliance.
- ☼ Neutral assessment and optimal selection of technology options.
- ☼ Avoided diversion of your capital investment from the core business.
- ☼ Connection to our worldwide R&D network, bringing innovation into the waste-to-energy sector.
- ☼ Public relations benefits.
- ☼ Expanded nutrient and water management options.
- ☼ New value streams through registering the project with the United Nations Framework Convention on Climate Change (UNFCCC) as a Clean Development Mechanism (CDM) project.



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