Anaerobic digestión and biogas plants in Africa

Integrated organic mater management for a Sustainable Agroindustrial sector

Biogas Success story in Africa...
Key sustainability indicators to consider in agribusiness

- Integrated organic matter management for a sustainable production and use of bioenergy.
- Lead agribusiness to a more sustainable production and use of bioenergy to add value.
- Providing affordable bioenergy while solving waste disposal issues.
- Use sub products as biomass, biofuels and organic fertilizers.
- GOPDC Ghana has turned 2016 operations 85% on green energy coming out of Biomass in mill boilers and Biogas in refinery boilers.
Integrated organic mater management

Bioenergy

Environment

Agriculture
ANAEROBIC TREATMENT PLANTS

**Environment:** Treat Effluents (according environmental discharge standards)

**Agriculture:** Liquid stabilized organic fertilizer

**Bioenergy:** Power generation (gas, steam, electricity)
METHANE Activity in traditional treatment lagoons

Effluents with traditional treatment:
- SOIL CONTAMINATION
- SMELL CONTAMINATION
- WATER CONTAMINATION

Treatment with the appropriate management:
- RECYCLE NUTRIENTS (NPK)
- STABLE ORGANIC MATTER
- BIOGAS PRODUCTION
Anaerobic Digestion

Anaerobic digestion is a series of biological processes in which microorganisms break down biodegradable material in the absence of oxygen.

1. Hydrolysis
2. Acetogenesis
3. Finally, methanogens.
BIOGAS (CH4) + Treated effluent + anaerobic sludge NPK
Traditional process to a Sustainable Palm oil mill process

Crops / Plantation

Agroindustry

Effluent, WASTE?

Production

Water stream
Integrated organic mater management

Crops / Plantation

Liquid Organic Fertilization

Palm oil products

Subproducts: Liquids and solids

Agroindustry

OM management Technologies

Biogas / Biomass

Liquid and solid waste valorization

Certification (CDM/RSPO/ISO/...)

85% Green energy 2016 in GOPDC GHANA

THERMAL ENERGY
ELECTRICITY

85% Green energy 2016 in GOPDC GHANA
Sustainable investment in agribusiness:
Société d'Investissement pour l'Agriculture Tropicale (SIAT)

- 2 Large scale biogas projects operational in Africa.
- GHANA, BIOGAS plant in operation: GOPDC- GHANA
- NIGERIA, BIOGAS plant in operation: PRESCO PLC- NIGERIA
GOPDC IN GHANA

- Commissioned and started up in August 2014
- 2 x 10,000m³
- 1 x 12,000m³ storage
- Treatment installed capacity of 160,000 m³/POME/year
- Potential biogas production: 4,000,000 Nm³/biogas/year
- 1T FFB = 15 Nm³ CH₄, and 1Nm³ Methane is equivalent to 1Lt of diesel..... All biogas produce is used in refinery boilers to replace fossil fuel.
Average 90% removal efficiency !!!
Total Biogas captured up to date in GOPDC, GHANA: **7,969,785 Nm³ Biogas**
Total fuel substitution with Biogas up to date in GOPDC boilers, GHANA:
4,424,448 lts of Diesel

Diesel substitution in boiler(s) (L)  Flare Diesel equivalent (L)
- Flare ignition in November 2013
- Commissioned and operational since April 2014
- 2 x 9,500m³ Reactors
- Treating installed capacity of 160,000 m³/POME/year
- Potential biogas production theoretically: 4,000,000 Nm³/biogas/year
- Foreseen for 2018 additional 20,000m³ reactor.
- 4MW output out of Biogas foreseen after expansion for refinery and new Genset.
Total biogas Captured up to april 2017: 14,629,325 Nm3 Biogas
Fossil fuel substitution with Biogas 2014 and 2015: **2,884,376 lts Kerosene**
Fossil fuel substitution with Biogas 2016 and 2017: **1,592,304 lts of Kerosene**

Total fuel substitution with Biogas up to date in PRESCO boilers, Nigeria: **4,476,680 lts Kerosene**
In support to Paris agreement for the climate change:

It’s not only about waste treatment.... But also about the Potential clean Energy we are wasting! *

Lets Make our Planet Great Again!

*Alex Bulnes
Group Bioenergy Manager

Thank You!!