Anaerobic digestión and biogas plants in Africa

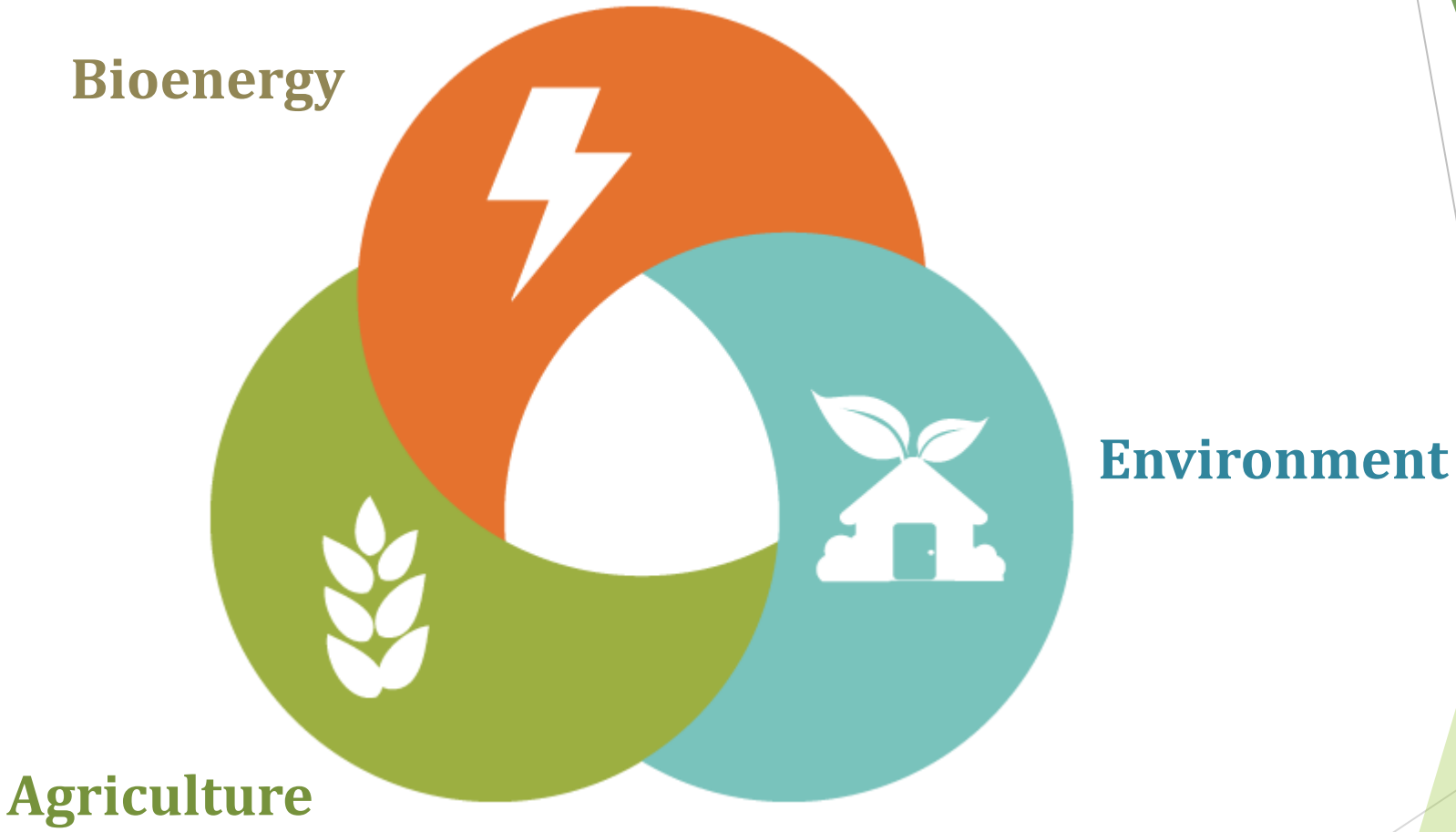
Integrated organic mater management for a Sustainable Agroindustrial sector

Biogas Success story in Africa…

Key sustainability indicators to consider in agribusiness

- Integrated organic mater 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



ANAEROBIC TREATMENT PLANTS

Environement: Treat Effluents (according environamental discharge standards)

Agriculture: Liquid stabilized organic fertilizer

Bioenergy: Power generation (gas, steam, electricity)

METHANE Activity in traditional treatment lagoons

Effluents with traditional treatment:

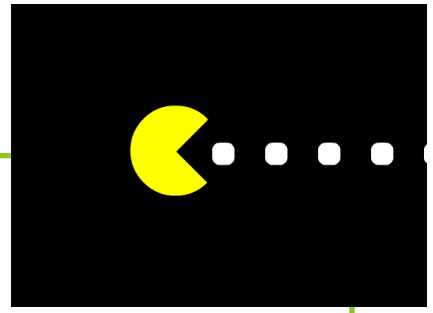
- SOIL CONTAMINATION
- SMELL CONTAMINATION
- WATER CONTAMINATION

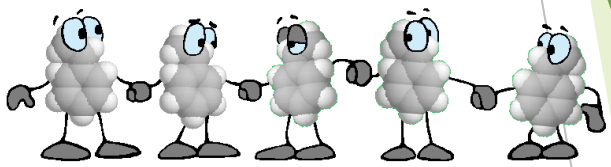
Treatment with the aproppriete managemen:

- 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.



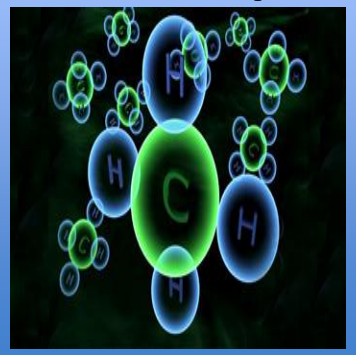


1.hydrolisys

2. Acetogenesys

3. Finally **methanogens**.

BIOGAS $(CH4)^{+}$



Treated effluent + anaerobic sludge NPK

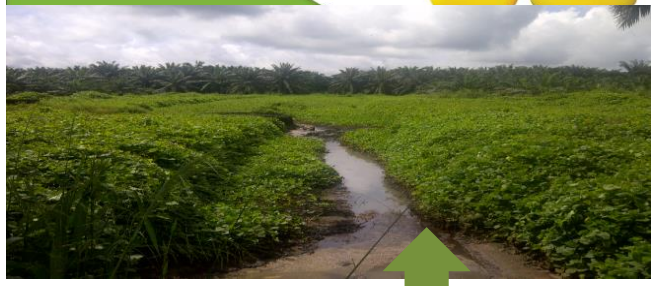
Traditional process to a Sustainable Palm oil mill process

Production

Agroindustry

Crops / Plantation

Effluent, WASTE?



Water stream

Integrated organic mater management

Palm oil products

Agroindustry

Subproducts:
Liquids and solids

OM management Tecnologies

Liquid and solid waste valorization

Certification
(CDM/RSPO/ISO/…)

Crops / Plantation

Liquid Organic Fertilization

Biogas /Biomass

THERMAL ENERGY
ELECTRICITY

85% Green energy 2016 in GOPDC GHANA

Sustainable investment in agribusiness:

Société d'Investissement pour l'Agriculture Tropicale (SIAT)

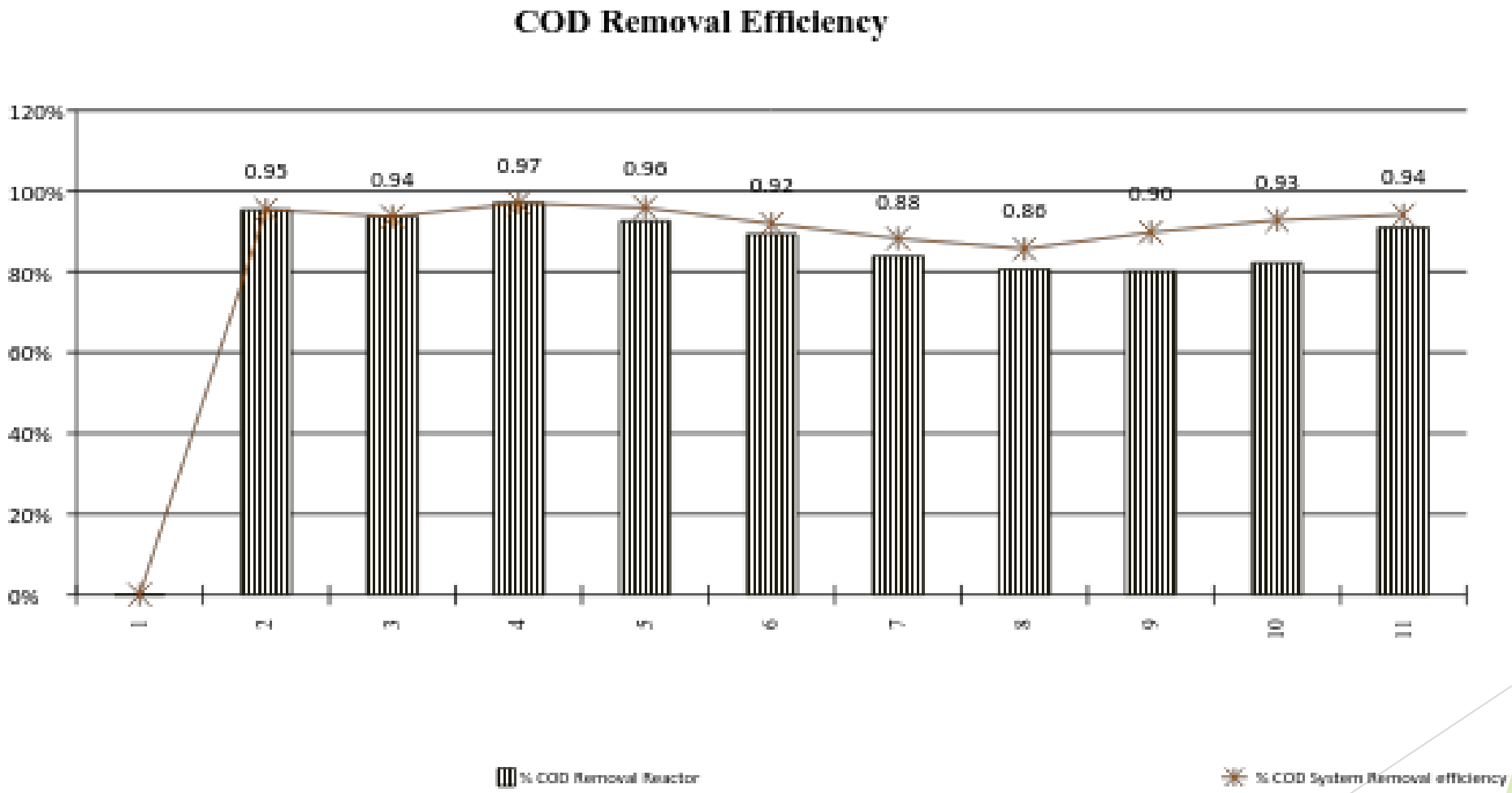
- **2 Large scale biogas projects operational in Africa.**
- **GHANA, BIOGAS plant in operation: GOPDC- GHANA**
- **NIGERIA, BIOGAS plant in operation: PRESCO PLC- NIGERIA**

GOPDC IN GHANA

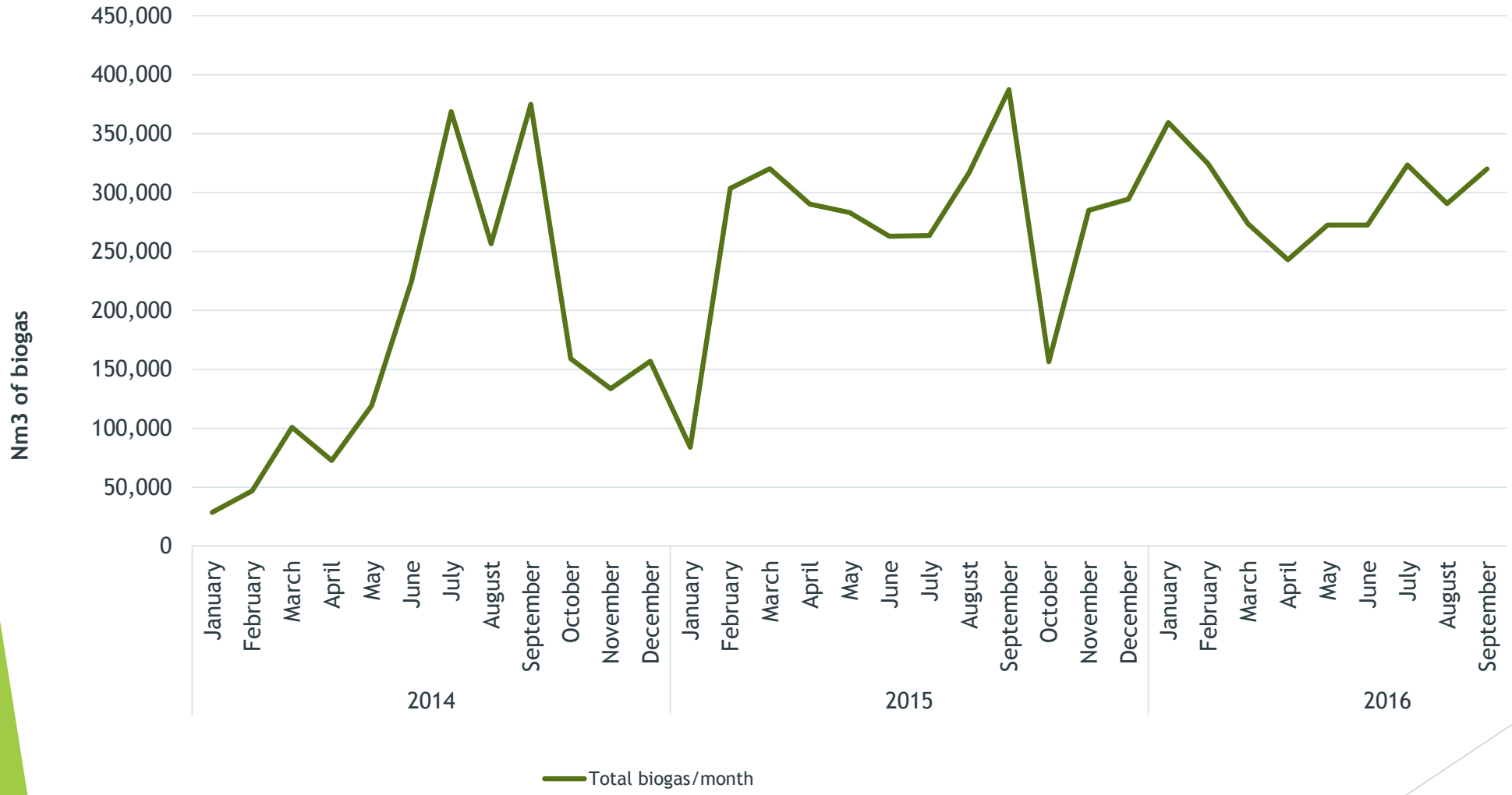
- Commissioned and started up in August 2014
- 2 x 10,000m3
- 1 x 12.000m3 storage
- Treatment installed capacity of 160.000 m3/POME/year
- Potential biogas production: 4.000.000 Nm3/biogas/year

- 1T FFB = 15 Nm^3 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 efficency !!!

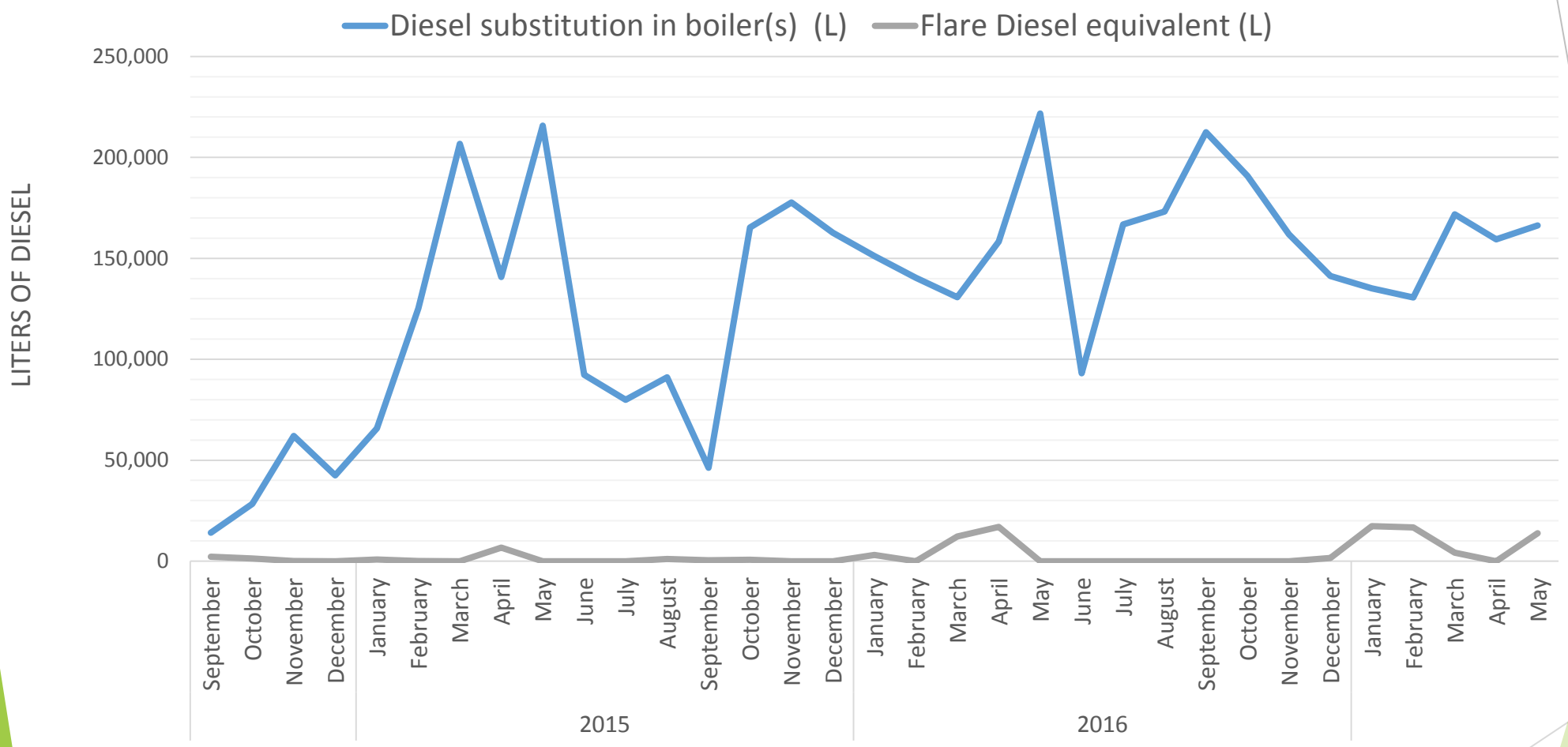


Total Biogas captured up to date in GOPDC, GHANA: 7,969,785 Nm^3 Biogas



Total fuel substitution with Biogas up to date in GOPDC boilers, GHANA:

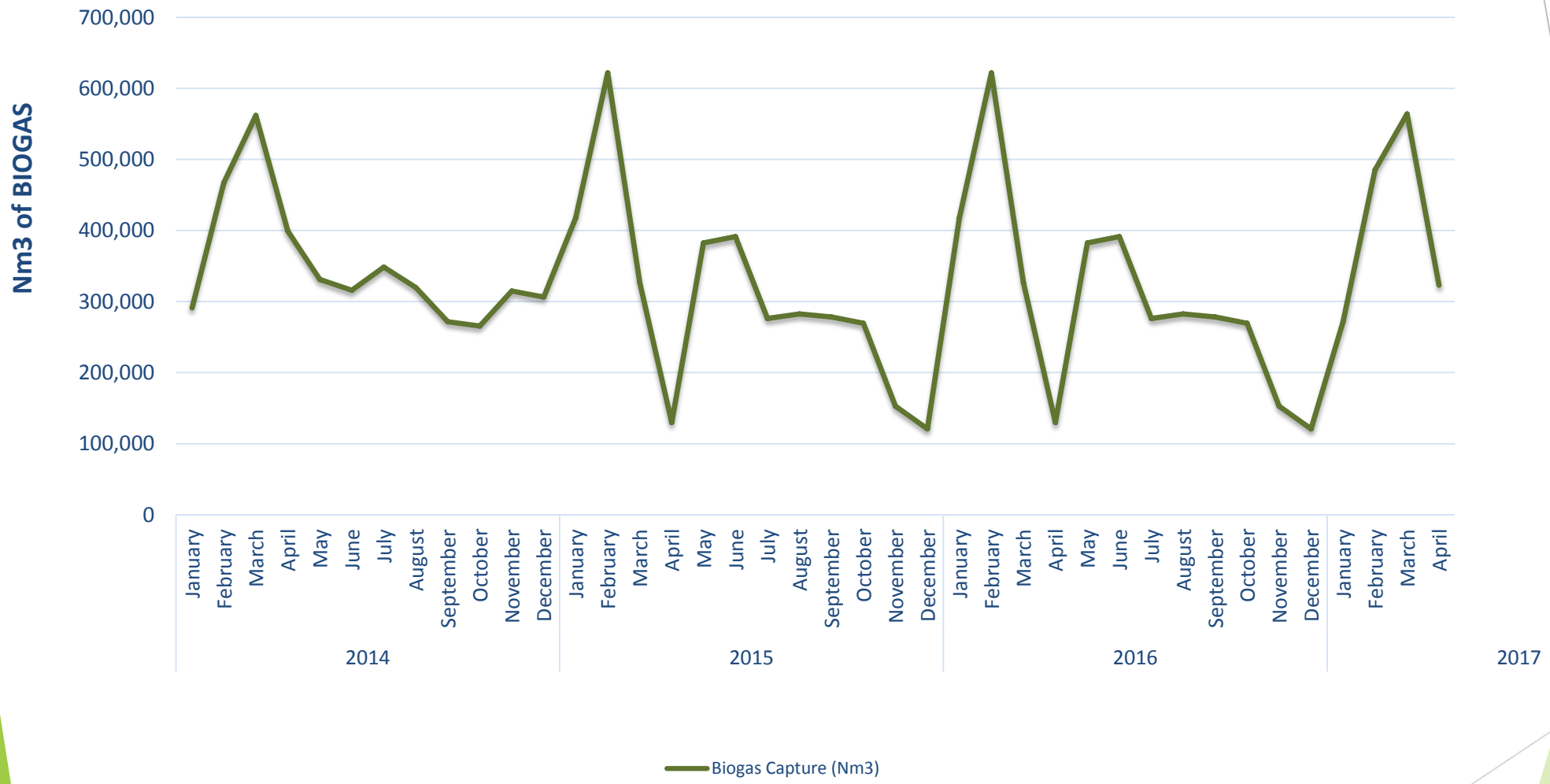
4,424,448 lts of Diesel



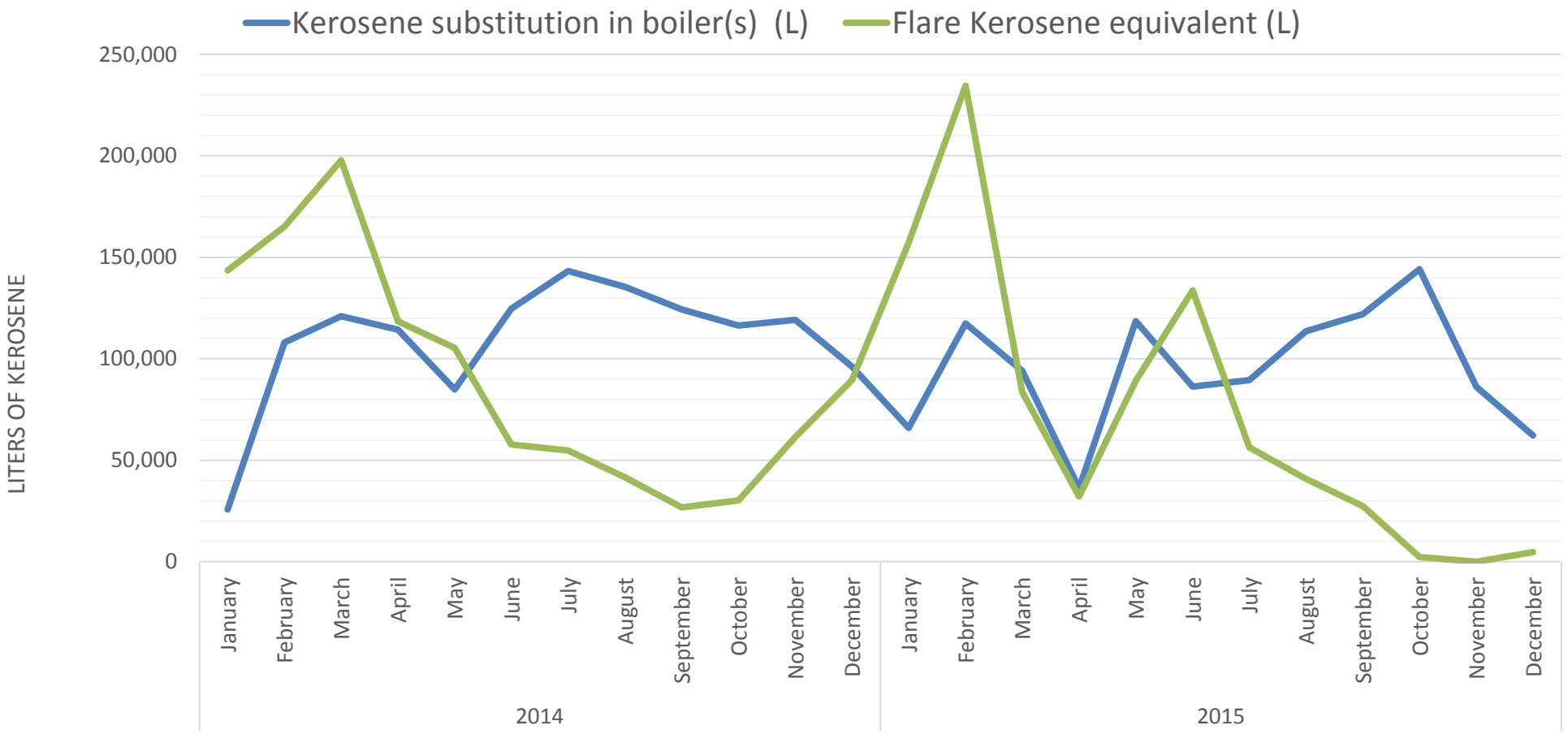
PRESCO NIGERIA

- 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.

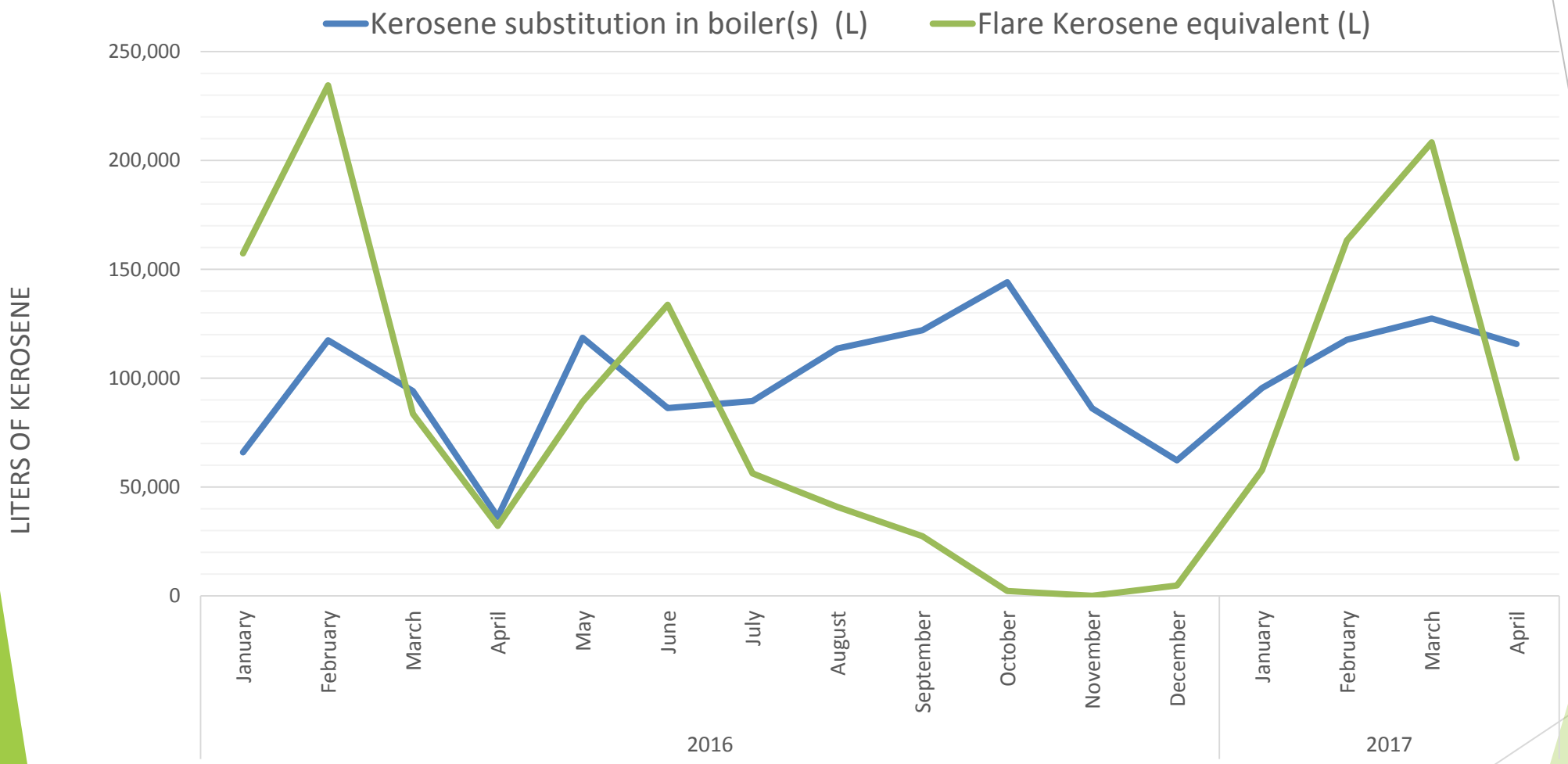
Total biogas Captured up to april 2017: 14,629,325 Nm3 Biogas



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

Waste?... Think sustainable..

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!!