

ONE DAY SENSITIZATION SEMINAR

ON

SUSTAINABLE TANNERY WASTE MANAGEMENT  
THROUGH CONVERSION OF WASTE TO BIOGAS  
FOR GENERATION OF ELECTRICITY, HEAT AND  
ORGANIC MANURE

BY

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POLICY IMPLEMENTATION PLAN

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**UNDERSTANDING TANNERY SOLID WASTE AND THE  
NATIONAL LEATHER AND LEATHER PRODUCTS  
IMPLEMENTATION PLAN: DEVELOPMENT OF BIOGAS**



## NATIONAL LEATHER AND LEATHER PRODUCTS POLICY IMPLEMENTATION PLAN



- The first stand-alone leather policy, National Leather and Leather Products Policy was spearheaded by NILEST and some MDAs, NGOs, Private and International Organizations.
- The Policy was approved by FEC under the chairmanship of Mr. President, Muhammadu Buhari on 31<sup>st</sup> October, 2018.
- The Honourable Minister of Science and Technology, Dr. Ogbonaya Onu, on 12<sup>th</sup> March, 2019, inaugurated the National Steering Committee for the development of the National Leather Policy implementation plan and the coordination of Plan.
- On 6<sup>th</sup> of July, 2021, the Vice President of Federal Republic of Nigeria, His Excellency, Prof. Yemi Osinbajo, GCON, formally launched the National Leather and Leather Products Policy Implementation Plan.

## COMPLIANCE (ENVIRONMENTAL & SOCIAL BEST PRACTICES)

### Rationale

Ensure compliance with environmentally and socially responsible business (ERSB) practices

### Objectives

The policy is designed to;

- Build and/or strengthen infrastructure that will ensure environmental compliance
- Adopt cutting-edge technology for waste management.
- Establish measures that will compel industry players to respect the international standard on social responsibility.

### Strategies

- Promote integration of environmental concerns among industry operators.
- Ensuring efficiency in waste management by enforcing environmental standard compliance.

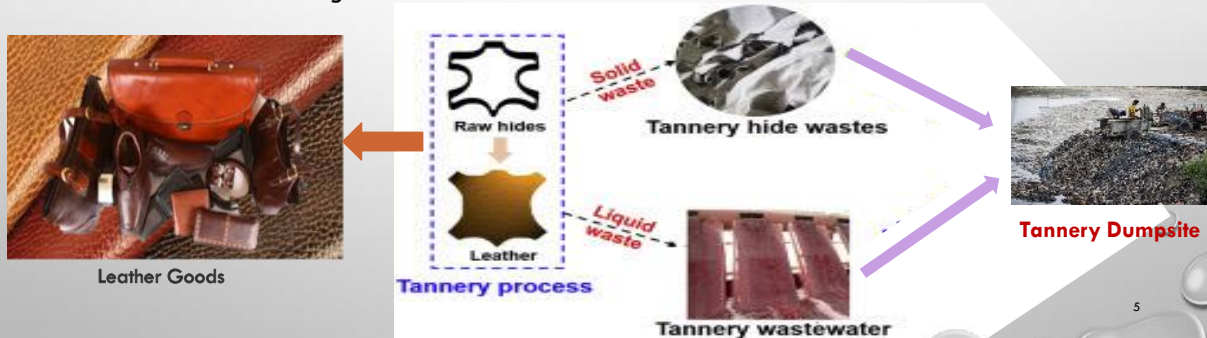
- Ensuring the provision of commensurate compensation for environmental damages and public safety breach.
- Developing industrial safety standards for the leather sector
- Introducing/encouraging eco-labelling of leather and leather products.

### Key Performance Indicators (KIPs)

- Number of beneficiaries.
- Level of reduction of toxicity in waste.

## THE LEATHER INDUSTRY

- Tanning is a process of conversion of raw hides and skins from animals, reptiles, fishes, birds and so on into leather used for clothing, shoes, bags, belts, mats, upholstery and a variety of leather goods and accessories.
- Huge amount of waste as solid, effluent/liquid and gases are generated in the process. In the conversion of a ton of hides to leather only about 20 - 25% is converted to leather and about 35 m<sup>3</sup> wastewater/effluent is produced consisting of high concentration of salts, chromium, ammonia, dye, chemical solvents and sludge from the raw hides and skins.



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## POTENTIALS OF THE LEATHER INDUSTRY

- Leather is the major source of foreign revenue for most countries such as, India, USA, China, Italy, Ethiopia, Uganda, Rwanda, Kenya and Nigeria.
- The leather industry is one of the key industrial sector in Nigeria with a high potential towards commodity development that has socio economic importance and positive impacts rural development, employment and wealth creation.
- Nigeria is one of the highest producers of leather and finished leather products in Africa; a study carried out by the Nigerian Economic Summit Group (NESG) estimated that the Nigerian leather industry has the potential to generate over 1\$b by 2025. In 2018, leather export value rose to 117 million dollars but fell in 2020 mostly due to COVID-19. Currently exports are in the order of 272 million dollars.
- The leather value chain is extensive, it includes animal husbandry, tanneries, finished leather products and leather products marketing. It currently employs over 750,000 workers with about 500,000 workers in the finished leather goods sector.
- The big markets for Nigeria's semi-finished and finished leather are Italy, Spain, India, Asia and China.



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## COMPOSITION OF TANNERY EFFLUENT

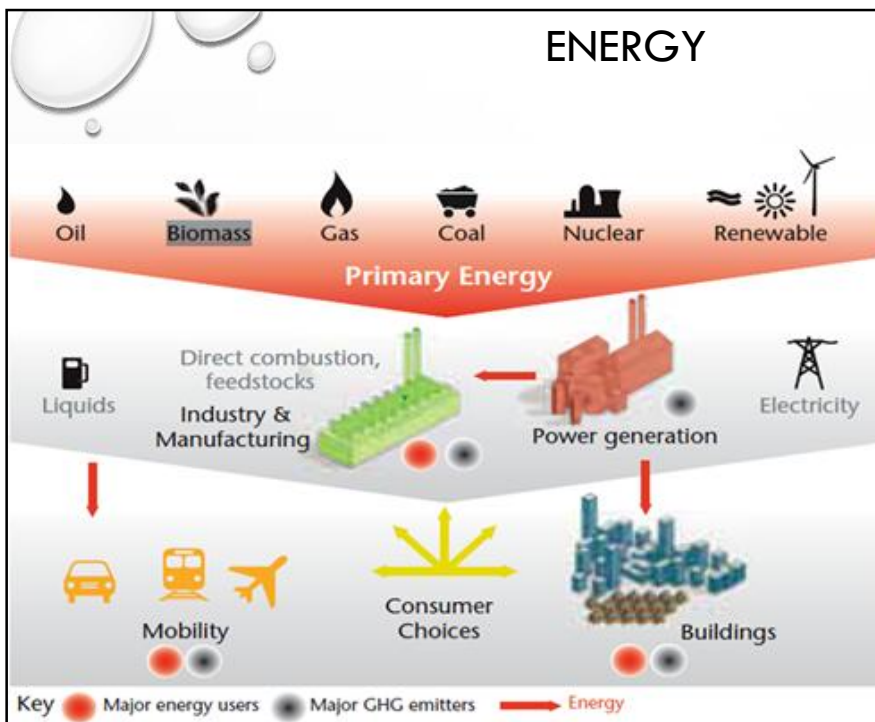
Tannery effluent is as characterized in table 1.

**Table 1:** Physicochemical Properties of Tannery Effluent

Parameters	Effluent	Standard
BOD (mg/l)	4464	30
COD (mg/l)	12840	250
TDS (mg/l)	21300	2100
TSS (mg/l)	1250	600
DO (mg/l)	2.72	4.5
EC ( $\mu\text{S}/\text{cm}$ )	42500	1200
pH	8.3	5.5 - 9
Cl <sup>-</sup> (mg/l)	13.8	1000
bb	17.1	5
Cr (mg/l)	10.348	2
Zn (mg/l)	1.5241	1
Ni (mg/l)	0.1513	3
Na (mg/l)	12006	nm
Pb (mg/l)	0.1818	0.1
Fe (mg/l)	14.675	10
Cu (mg/l)	0.4112	0.1
Cd (mg/l)	0.0046	2

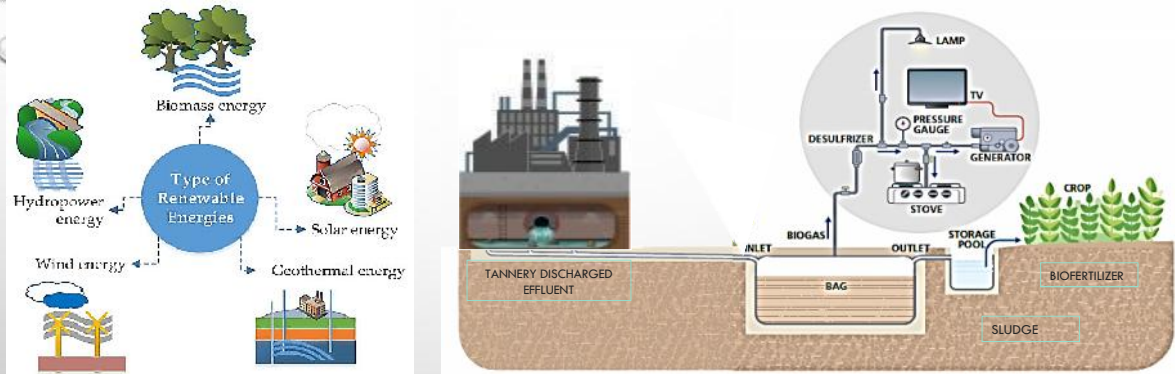
**Legend:** BOD- Biological Oxygen Demand, COD- Chemical Oxygen Demand, TDS- Total Dissolve Solid, TSS- Total Suspended Solid, DO- Dissolve Oxygen, EC- Electrical Conductivity

## ENERGY



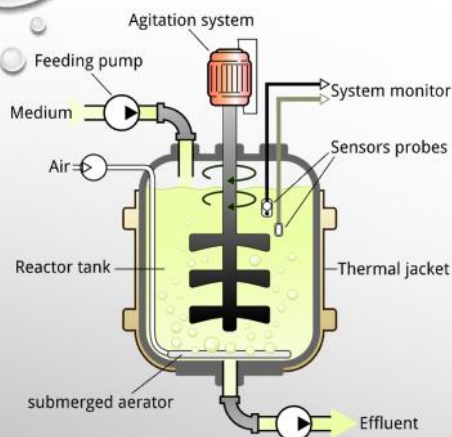
- Energy is the power derived from the utilization of physical or chemical resources especially to provide light and heat or to work machines.
- The primary source of energy includes; petroleum, gas, nuclear, coal and renewable (solar, wind, bio-gas & mass, geothermal).

## RENEWABLE ENERGY



- Biogas is an aspect of renewable energy generated from organic domestic/municipal, agricultural and industrial composites/waste.
- It involves the synthesis of such waste mostly under anaerobic conditions.
- The composition of the bio-gas, is about 70% methane ( $\text{CH}_4$ ) and 29% carbon dioxide ( $\text{CO}_2$ ) with insignificant traces of oxygen ( $\text{O}_2$ ) and hydrogen, carbon monoxide ( $\text{CO}$ ), nitrogen ( $\text{N}_2$ ) and sulphide ( $\text{H}_2\text{S}$ ).
- Methane gas is a good source of energy for combustion both for domestic and industrial heating and electricity generation. The energy is sustainable, economic and environmentally friendly compared to energy from fossil fuels.
- Also, the byproduct (digestate) can be used as bio-fertilizers in agriculture.

## BIOGAS



- Digesters are bioreactors designed and produced for effective biological reactions cultured either by aerobic or anaerobic conditions for microbial/enzymic immobilization engaged in the generation of biogas.
- The reactor must meet certain operating conditions necessary for optimal performance. Such operating conditions include; temperature, PH, agitation, biochemical kinetics, aeration, concentration of microbes, rheology, form of feeding, carbon/nitrogen ratio, hydraulic retention and mixing ratio amongst others.

## BIOGAS TO ELECTRICITY

- Biogas can be used for combined heat and power (CHP) operations
- It can also be turned into electricity using a combustion engine, fuel cell, or gas turbine.
- The biogas as fuels in such engines, are converted into mechanical energy powering an electric generator to generate electricity.
- The resultant electricity can be used on site, or sold onto the electric grid



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