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BIOFUEL AS A VERITABLE SOURCE OF ENERGY FOR NIGERIA

In the late 90's, conflicts in the Middle East caused the Organisation of Petroleum Exporting Countries (OPEC) to cut exportation of oil. This led to severe shortages worldwide. The alternative option discovered was carbohydrates from renewable resources with low cost, renewable feedstock.

Resources for Biofuels Production

Biomass; material derived from recently living organisms including plants, animals and their by-products, e.g. manure, garden waste and crop residues

Wastes

Wastes contain three primary constituents, which are cellulose, hemicelluloses and lignin and can contain other extractives like extractives. Cellulose and hemicelluloses are carbohydrates that can be broken down by enzymes, acids or other compounds to simple sugars, and then fermented (a means of conversion) to produce ethanol renewable electricity, fuels and biomass-based products.

Agricultural Residues

Biomass can be obtained from waste plant material. For example, Soybean curd residue supplements have been found to be very significant for enhancement of methane production from pre-treated woody waste. Some other agricultural products that are specifically grown for biofuel production include corn, wheat, rapeseed, sugar beet, sugarcane, palm oil, soghum, cassava and jatropa. These plants are currently being used as sources of bioenergy in the United States, China, Brazil as well as India.

Municipal Wastes

These are a combination of household and industrial/commercial refuse which include municipal solid waste, municipal wastewater or sewage and bio-solids from wastewater treatment. It also includes landfill gas generated from waste disposed in landfills and includes construction and demolition wood residue, paper and cardboard, grass, landscape tree removals, other green waste, food waste and other organics. Also included in this category is filtered waste vegetable.

Types of Biofuels

The first generation biofuels

The first generation of biofuels products are made from sugar, starch, vegetable oil or animal fats using conventional technology.

Biogas of the first generation is also a renewable fuel, which can be used to produce electricity, space heating, water heating and process heating. If compressed, it can replace compressed natural gas for vehicular use.

Biodiesel also of the first generation of biofuel is produced from fats processes to obtain chemical compounds that are used as is, or blended with diesel fuel. The fat can come from used cooking oils, plant extracts and animal fats. Biodiesel is a completely renewable resource. It is a substitute for fuels that produce a lot of soot and carbons.

Other first generation biofuel products include Syngas and microbial hydrogen

The second generation biofuels

Second generation biofuel production processes can use a variety of non-food crops. These include waste biomass, stalks of wheats, corn, wood and special energy to biomass crops like Miscanthus. Second generation biofuels use biomass to liquid technology including cellulose biofuels from non food crops.

The third generation biofuels

Third generation biofuel is also known as algae fuel. Algae are low-input/high-yield feestock to produce biofuels and algae fuels are biodegradable; and relatively harmless to the environment if spilled.

These renewable resources serve as an alternative viable energy source for Nigeria.