

## **Biofuels- fuel of the future?**

Have you ever rode in a “soyabean powered” bus? This bus is powered by a biodiesel produced from oils or fats from soy, which can also be produced from mustard, flax, sunflower, vegetable oil and even algae! But how does it work? Biofuel energy uses fuels derived from living or recently dead biological organisms through a process called carbon fixation (converting inorganic carbon into organic compounds).

There are various types of fuel such as biodiesel, bioalcohol, biogas, syngas, myco-diesel, solid biofuels (e.g. wood), and gasoline. To be more specific, there are various classifications or “generations” of fuel: first generation or “edible” biofuels made from crops such as wheat and sugarcane; second generation fuels produced from non-food crops such as wood, organic waste, food crop waste, third generation derived from aquatic organisms such as algae; fourth generation from specially engineered plants that can grow on bodies of water or non-agricultural land.

Beyond the chemical processes involved for biofuel production is a global debate about the real environmental impacts of this source of energy, more commonly referred to as the “fuel vs food” debate. Biofuels have long been touted as the ideal alternative fuel to fossil fuels, as the latter’s resources will eventually run out. Plants grown for this energy source also absorb carbon dioxide, which can reduce the amount of greenhouse gases contributing to global warming.

Biofuels can provide non-oil producing countries with an opportunity to supply their own energy needs once the right infrastructure is available. This can reduce dependency on foreign energy resources, which keeps vital revenue within the local economy. Biofuels can also stimulate economic development in the agricultural sector, which can particularly benefit rural or poorer communities. The Economic Times reports that cooking farm waste, especially 'wet' waste such as corn husks, tomato vines and manure, can turn it into biofuels to produce energy. Similarly, used cooking oils can also be converted to fuel, as illustrated by Troy Hadeed, a local environmentally-conscious entrepreneur in Trinidad. Hadeed converts waste vegetable oil into a biofuel for his vehicle; an innovative method for the average citizen to explore.

The disadvantages of biofuels suggest that this form of energy should be cautiously developed. Firstly, biofuels is largely agriculturally-based, which requires a fairly expansive land area. Land space is of course limited, particularly in densely populated countries. With the increasing need to provide food for future generations, scientists are uncertain whether both biofuel plants and food crops can coexist without comprising each other. Limited stocks of food can of course translate to higher food prices, which can devastate already impoverished countries. The real question is, “can we grow both?”

The associated requirements for mass agricultural operations such as pesticides, fertilizers and water supplies add to a list of challenges for biofuel production. Intense chemical applications on agricultural land can eventually seep into our water table, which has a host of problems on its

own. Excessive water usage on crops may not auger well with environmental conservationists; therefore a balance needs to be achieved.

The cost and energy demands to produce biofuels require careful examination and comparison to conventional oil and gas production. Specialised machinery is also utilised in the processing of biofuels. Consideration therefore has to be given to the operational carbon footprint to determine its viability. For example, a 2005 study from Cornell University found that producing ethanol from corn used almost 30% more energy than it produced. If the amount of energy required exceeds the amount of energy produced, then one must question whether this method is progressive or regressive.

Bio fuel production may also require a heavy initial capital investment, and many countries may not have the financial means of doing so. Biofuel production should be both environmentally-friendly as well and financially practical for it to be successful.

The creation of biofuels was intended to be a cleaner, more sustainable form of energy for the world to benefit from. The pros and cons of this resource have been examined, and it is up to each country to determine whether this method of energy production is worthwhile. One thing is for certain- the human capacity for research and innovation is forever expanding and we are constantly searching for new ways to live in harmony with our earth.

If you have any comments or would like to contribute to this column please send us an email at [emacorner@ema.co.tt](mailto:emacorner@ema.co.tt).