ENERGY

# If fossil fuel is too expensive, go for 'green' biodiesel to run cars

When the German engineer Rudolf Diesel invented an efficient engine that would bear his name, the idea was to provide affordable energy for smaller industries and farmers.

Diesel initially powered his engine using peanut oil and coal dust; it was designed to use vegetable oils. He eventually discovered that the by-product of crude oil distillation, 'distillate', was the best match. This was eventually renamed to 'diesel fuel' as it's widely known.

Diesel noted in 1912: "The use of vegetable oils as engine fuels may seem insignificant today but such oils may become, in the course of time, as important as petroleum and the coal-tar products of the present time."

That time has arrived. Vegetable oils do not pollute and are environmentally clean; they are a renewable form of energy. However, the use of renewable energy sources raises issues of public taxation, especially when used to power motor vehicles.

Fossil fuel is not intrinsically expensive; the consumer price is escalated because governments consider it a convenient vehicle for taxes. Fuel is the blood of the economy — powering vehicles and industries and used in households for cooking. Any tax on fuel touches everyone.

Excise duty is charged on fossil fuels due to its polluting nature and is expected to internalise the externalities associated with pollution. The difference in price between super, regular, diesel and kerosene is purely the result of the taxation policy.

Also charged on the fuel are merchant shipping, road maintenance, petroleum development, petroleum regulation and railway development levies. Other costs include storage, transportation and oil marketers' margins.

Tax and levies constitute the largest fraction to the cost of fuel in Kenya — about half of the price. Also, marketers have previously colluded and exhibited monopolistic tendencies in their pricing. The Energy Regulatory Board (ERC) has attempted to curb this by capping pump prices, which marketers take as a *de facto* price control and quote the maximum, regardless of costs.

## Own fuel

'Manufacturing' your own fuel — such as renewable ones — will cut out the middlemen and deliver substantial cost savings. If you fuel your car with it, however, you will not be paying the road maintenance levy!

A few years ago, UK traffic police carried out raids to catch those using cooking oil to power vehicles and charged them with tax evasion. UK law now allows one tax-free usage of up to 2,500 litres of vegetable oil in vehicles yearly. Many other countries give tax breaks for the use of renewable fuels in cars.

DAN ODIDO

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But the use of vegetable oil as fuel should, ideally, not be subject to excise duty since it is 'green' and not polluting.

The use of vegetable oil in cars is a mature technology and is widely applied. You can hack and modify your engine. Modification kits are commercially available in many countries. You will, however, need to consider a few issues.

Vegetable oil can be used in three forms: Straight as pure plant oil (PPO); first utilised for other purposes and then the waste used for automotive purposes (waste vegetable oil, WVO); or first converted to 'biodiesel'. The typical diesel engine can use the fuel in any forms. Biodiesel can be used without any further processing or engine modification.

WVO may be obtained from typical restaurants, chips joints and other food processors that deep-fry their food. And since it may contain animal and fish oil from cooking, a more accurate term is 'used cooking oil (UCO)'. Due to impurities, the oil first needs some processing. Vegetable oil is also much thicker (viscous) than diesel and may crystallise in cold weather.

The use of biodiesel, made using natural vegetable oils and animal fats and also WVO, generally does not require modification to a diesel engine.

Popularising the use of renewable energy has several benefits to the economy. It releases pressure from the importation of fossil fuel, saving foreign exchange; enhances energy independence; develops non-traditional industries, broadening the manufacturing base; and provides employment.

The policy framework is, largely, in place. It is up to the innovators to take up the challenge and provide us with affordable cleaner energy.

Mr Odido heads the Department of Flying Studies in the School of Aerospace Sciences of Moi University. odido@aerospacekenya.com. Twitter: @aerospaceKenya