

NEWS IN DEPTH



Consumer's Choice business development manager Mohamed Kadhi lights a Bio-Ethanol stove. It uses the ethanol gel, a litre of which can burn for 4.5 hours unlike paraffin. Below, a solar cooker that cooks any food except deep fried foods using blackened pans. JACOB OWITI



Unique biofuel warms its way to kitchen as search for green energy hots up

Made from molasses, this viscous yellow gel will save forests that could have been felled for firewood and cuts costs for urban households using paraffin, writes **FRANKLINE SUNDAY**

Standing in his exhibition stand at the Kisumu Regional Agricultural Fair, Mr Mohamed Kadhi holds up a bottle of viscous yellow gel and explains to the group of onlookers the wonders of what he terms as the "the future of the country's energy needs".

What he is holding up is a bottle of bio-ethanol gel, an alternative bio-fuel developed by Consumer's Choice Limited to bridge the country's reliance on petroleum products.

The quest for green and renewable energy has been top on the agenda of world economies over the last decade as oil production continues to drop.

Green energy

As the demand for energy soars on the back of a robust global economy, the cost of crude oil which is the basic component that sustains most of the world's energy needs remains high. This has led to increasing production costs, forcing consumers to dig deeper in their pockets for essential commodities leading to increased inflation.

It is on this background that the government initiated the Green Kenya Initiative (GKI) to advocate for the development of policies, strategies and investment choices that will drive the adoption of green and renewable energy solutions. To boost this endeavour, the World Bank recently approved a \$330 million loan (Sh2.64 billion) to help the country invest in renewable energy.

Much of the effort has however been on large scale projects and this prompted Consumer's Choice Limited to embark on a project to provide alternative energy solutions for rural households.

"The future of the country and of the world is in adopting renewable energy and we have sought to develop affordable energy solutions for this emerging market," says Mohamed Kadhi, the business development manager at

Motopoa benefits

■ The viscosity of the gel is designed to make its use safer by minimising cases of accidental spillage.

■ The bio-ethanol gel retails at the recommended price of Sh160 per litre while the stove goes for Sh1,800.

■ A litre of the gel burns for four and a half hours which is more than the energy output derived from paraffin.



Consumer's Choice.

The company has developed a bio-ethanol gel that is made from molasses, a by-product of sugarcane. "During the sugar extraction process, molasses is derived as one of the by-products", explains Mr. Mohamed. "The molasses is used to develop technical alcohol which is the chief ingredient of the bio-ethanol gel".

Consumer Choice Ltd obtains their technical alcohol from the Agro Chemical and Food Company in Muhoroni which is currently the sole producer of technical alcohol in the country.

"What then happens is that we take the technical alcohol and export it to Tanzania where we have a partnership with Moto Poa Limited, a company that manufactures bio-fuels and specialised stoves".

The technical alcohol is enriched with other chemical additives to enhance its physical and chemical composition for increased efficiency. The result of the enrichment is a viscous yellow liquid that burns slowly and emits a higher heat output. The viscosity of the gel is designed to make its use safer by minimising cases of accidental spillage. The final product is then shipped back to Kenya ready for packaging and distribution.

The bio-ethanol burns on specialised stoves that emit heat similar in temperature to the heat

output of liquefied petroleum gas, LPG cookers. Already, Consumer's Choice Ltd has entered an agreement with Ukwalu supermarkets to be their retail outlets for the Moto Poa bio-ethanol gel and stoves and is planning to increase the distribution network to other retail stores.

The bio-ethanol gel retails at the recommended price of Sh160 per litre while the stove goes for Sh1,800.

"This is an alternative and clean energy solution especially in rural and poor households who use firewood, crop waste or paraffin to cook," says Mr Mohamed. "One litre of the gel burns for four and a half hours non-stop which is far more than the energy output derived from paraffin.

In addition to this, unlike paraffin and coal, bio-ethanol gel cuts down on harmful indoor emissions and is enriched with a chemical additive that produces a sweet smelling lemon fragrance that also acts as a mosquito repellent".

Since its introduction in the Kenyan market, Consumer's Choice has sold over 2,000 units and is looking to upscale its production by creating partnerships with UN agencies and other non-governmental organisations.

"We are currently partnering with the United Nations High Commission for Refugees, UNHCR in a pilot project at the

Kakuma refugee camp. Under the programme, 70 families have been supplied with the stove and a daily one litre ration of bio-ethanol gel".

The project is meant to encourage the refugees at the camp who mostly rely on firewood for cooking, to adopt clean and sustainable energy alternative.

"The refugees at the camps cut down trees and shrubs for firewood which is not sustainable and certainly not in arid parts like Northern Kenya. The gradual but steady deforestation will eventually lead to complete exhaustion of the already sparse vegetation cover and they will have no energy resource to turn to".

As the country soldiers on the quest for alternative and clean energy, Mr Mohamed and his team are betting on increased awareness and sensitisation to drive up the demand from households keen on adopting bio-ethanol. The company buys the entire stock of Agro-Chemical's technical alcohol of 105,000 liters per month and has the capacity of supplying up to 140,000 litres of ethanol gel per month.

While Consumer's Choice states that this production can easily be doubled by the beginning of next year, the company is calling on the

Ms Leah Achieng (below) from Kadibo in West Kano demonstrates how the 'Pulsee' and 'CookIt' solar cooker works at the Ministry of Agriculture stand at the Kisumu show-ground.

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government to remove duty levied on the bio-ethanol gel.

"We are forced to export the technical alcohol to Tanzania for value addition while we can do it on our own here in Kenya. The problem is that the Kenya Revenue Authority, KRA levies very steep excise duty on the production of the gel", says Mr. Mohamed.

"If we were to produce the gel locally, the overall local production costs would double and this would cause the eventual shelf price of the gel to rise beyond the reach of our target consumers". The bio-ethanol gel can also be made from other crops such as sugar beet, maize, wheat and potatoes among other crops.

Elsewhere, in a village in Nyakach, Kisumu County, Mrs. Jessica Ochieng' prepares the ingredients for a normal mid-day meal at 10am. Her method of cooking is however different from her neighbours' by more than just the ingredients.

Her meal is prepared entirely by a solar powered contraption dubbed CookIt which is a simple but efficient device made up of recycled paper lined with aluminum foil that harvests the sun's rays and converges them onto a blackened surface. The surface is the normal light weight grade found in local supermarkets that is painted over with black paint.

Preserving environment

CookIt has been adopted by women in Nyanza and Western Kenya and has been touted as a practical and affordable solution to cutting reliance on wood and charcoal fuel in rural communities, thereby preserving the environment.

"The kit can cook any type of food from Ugali to cakes except for deep fried meals and it eliminates the need for constant supervision", explains Ms Ochieng'.

"For a standard meal of Ugali for example, one only needs to mix the maize flour and water in the ratio of 1:1, cover it tightly with the lid and after two hours in the sun, the meal is ready," she explains.

In addition to this, the solar cooker is portable and it can be carried to the field where the food can slowly cook un-attended while one is left free to work on the field.

A brain-child of Dr Bob Metcalf, professor of Biological Sciences at California State University, Sacramento, the solar cooker first made its debut in the Kenyan consumer market via Solar Cookers International (SCI).

Innovations such as CookIt and Moto Poa are examples of grassroots efforts that if scaled up nationally, could go a long way in solving the two-pronged problem of finding clean renewable energy and stemming environmental degradation.

franklinesunday@gmail.com

Planning software boost for eco-friendly projects

The use of information technology in energy planning can contribute not only to developing renewable energy sources but also to moving towards a green economy.

The Long-range Energy Alternatives Planning System (LEAP) is a software tool developed at the non-governmental Stockholm Environment Institute (SEI) that is widely used for energy policy analysis and climate change mitigation assessment.

"It's a sophisticated tool but at the same time user-friendly and functional," Charles Heaps, LEAP developer and director of the US branch of SEI, told Tierramérica. For example, he explained, if a government wants the answer to a specific question, such as the carbon footprint of a generator, the software gives rapid responses concerning a series of related questions, such as the location, capacity, and potential options for the resources to be used.

Distributed free of charge to government agencies, academics and non-governmental organisations in the developing world, LEAP has been adopted by hundreds of users, including consulting companies and energy utilities, in more than 150 countries worldwide.

LEAP is becoming the de facto standard for countries undertaking integrated energy resource planning and greenhouse gas mitigation assessments. More than 85 countries have chosen to use the software as part of their commitment to report to the UN Framework Convention on Climate Change (UNFCCC).

The RETScreen Clean Energy Project Analysis Software was created in 1996 by Natural Resources Canada - a Canadian government agency - and can be used to evaluate the energy production and savings, costs, emission reductions, financial viability and risk for various types of renewable-energy and energy-efficient technologies (known as

RETs). The software "can be used to eliminate the barriers frequently associated with clean energy projects," RETScreen engineer Kevin Bourque told Tierramérica.

"The programme enables a rapid assessment of the feasibility of these projects, given the decision-making tools for evaluating various options and focusing on the most viable," he said.

The 2009 World Bank-sponsored report "México: Estudio sobre la disminución de emisiones de carbono" (Mexico: Carbon Emissions Reduction Study) was based on LEAP, as was "Energy Consumption, Greenhouse Gas Emissions and Mitigation Options for Chile, 2007-2030", a study published in 2009 by the University of Chile's Environmental Management and Economics Programme.

It's a sophisticated tool, but at the same time user-friendly and functional

The Ministry of Natural Resources and Environment of Honduras designed an energy policy extending to 2030 which was modeled using LEAP.

RETScreen includes product, project, hydrology and climate databases, and has been adopted by more than 300,000 users in 222 countries and territories, with 1,000 new users a week. It is used in 300 universities, including 19 in Latin America, and has been translated into 36 languages.

In 2010, the software had 2,661 users in Mexico, which ranked 19th among countries where RETScreen is most frequently employed. For instance, four students from Humboldt State University in the United States used it to assess the viability of building a mini hydroelectric dam in a community near the city of San Cristóbal de las Casas, in the southern Mexican state of Chiapas.

For long-term planning, the Federal Electricity Commission of Mexico uses the MARKAL (Market Allocation) model, an analytical tool developed by the International Energy Agency.

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This wind farm near Kisielice in northern Poland could benefit from Long-range Energy Alternatives Planning System, a software tool that is widely used for energy policy analysis and climate change mitigation assessment for green projects. AFP

Going green with eco-friendly stoves

Ethanol gel combustion is cleaner, making it safe for the environment

By WANJIKU NJORGE

Families in most developing countries depend on wood or charcoal for cooking at the expense of the environment. The average rural family spends 20 per cent or more of its income purchasing wood or charcoal for cooking.

In addition, living in the city provides no panacea either as the urban poor frequently spend a significant portion of their income to purchase wood or charcoal for their energy needs. Besides the high expense, another problem of cooking over an open fire is the increased health problems like lung and eye ailments and other effects that are brought about by use of wood for cooking.

Deforestation and erosion are often the end results of harvesting wood for cooking fuel. To tame the rising destruction on the environment as a result of cutting down trees, a local company has come up with eco-friendly ethanol stoves. Consumer's Choice Limited has introduced in the local market the stoves which use ethanol gel rather than paraffin. The stoves are safer because they have a low centre gravity.

During an interview with *Development Agenda*, Andrew King'ori, from Consumers Choice Limited says that the Moto Poa stove, manufactured in China, uses Bio Ethanol Gel and is a high-performing stove which provides a significant health benefit to families otherwise dependent on solid fuels by eliminating dangerous smoke and gases from homes. The gel is manufactured in Dar es Saalam.

"The stove burns clean and indeed, it is very safe, not only protecting our environment but also saves on cooking costs," King'ori remarked. "This stove is number one and cheap since it goes for Sh1,500 while a two burner at 2500," added King'ori. He explained that the stove's fuel tank is not pressurised and holds the ethanol gel in an adjustable reservoir. King'ori noted that liquid or gaseous fuels are far superior to solid fuels for cooking because their combustion is considered cleaner and the existing supply chain is convenient. More so, liquid fuels have a much higher energy density than gaseous fuel like biogas.

"Among all the liquid fuels, which can be produced locally and in a renewable manner, ethanol is one of the best. Its combustion is almost as clean as that of Liquefied petroleum gas (LPG)," he said. King'ori commented that ethanol gel is a renewable form of energy made by mixing ethanol with a thickening agent and water. "The ethanol is extracted through the fermentation and distillation of sugars from sources such as molasses, sugar cane and sweet sorghum or starch crops, like cassava or maize," he explained.

The gel is more cost-efficient. "One litre of gel costs Sh165 per litre," he added. King'ori said that an added attraction of ethanol is that the paraffin price keeps fluctuating.

"The price of paraffin is going up and down with the petrol price," he said. Currently, one litre of kerosene goes for Sh85 and burns for just one day, therefore, making a litre of ethanol gel cheaper to use in the long run.

He noted that safety is also a big selling point in favour of ethanol products, particularly for those who use coal or paraffin for heating and cooking. Paraffin stoves, which explode or are easily knocked over, cause fires, and poor ventilation can lead to asphyxiation.

This leaves one with ethanol alternative which is thick thus difficult to spill in case of tipping over. Gel fuel burns with a carbon-free flame, so it does not cause respiratory problems such as asthma. The Bio Gel is



Mohamed Kadhi of Consumer Choice Limited, shows a client how Moto Poa Stove works during the exhibition.

non-toxic and non-explosive "The gel is not only cheaper than most conventional cooking energy but also environmentally friendly since its combustion results in completely environmentally clean emissions," he said.

King'ori commented that in Kenya, both the stoves and the gel are available at their shop, Consumer Choice

Limited which is off Kampala road, Naivas and Ukwala supermarkets countrywide. "However, we are working to widen the distribution to various other supermarkets in the near future," he added. "The Moto Poa stove drastically reduces green house emissions and this means a greatly reduced global warming impact," said King'ori.

Innovation benefits

Moto Poa stove, uses Bio Ethanol Gel which provides a significant health benefit to families otherwise dependent on solid fuels by eliminating dangerous smoke and gases from homes. It burns clean not only protecting environment but also saves on cooking costs.

165
SHILLINGS

PER LITRE
cost of ethanol gel for
moto poa stoves

★ STARLIFE

DJ LEMON SPINS OFF A ROCKING PARTY

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MOTO POA STOVE CHANGING THE WORLD OF ECO-ENERGY

BY HENRY KIBIRA

In a world that is embracing green technology, organisations are working to provide quality, affordable safe energy to the public. Most strive to use locally available waste materials which are transformed to produce an improved alternative source of fuel.

Consumers Choice, which has roots in Kenya and Tanzania is offering a reprieve to households' fuel budgets with their innovative, environmentally friendly and affordable cooking stoves.

The modern Moto Poa stoves come in two packages, a single and two-burner. It is easy to use and portable, making it every consumer's choice.

In a shift from the use of hazardous fuels such as kerosene, Moto poa uses bio ethanol gel, which is made from sugarcane waste recycled to produce the cooking fuel.

"From molasses we get extra neutral alcohol which is used for making alcoholic spirits, while the remnant product is called technical alcohol," says Andrew King'ori, CCL's Marketing and Distribution manager.

The company gets sugarcane residue from Muhoroni Sugar Company in Nyanza Province as a bi-product from the manufacturing of sugar. Then they export the alcohol to Tanzania, where the gel is manufactured, before being released into the market for local and regional consumption.

CCL has been in operation for two years, and is making strides into the larger Eastern Africa region, with services set to be rolled out in Uganda, Rwanda, Eritrea, Democratic Republic of Congo and the newly formed state of South Sudan.

In Kenya CCL has partnered with UN-HCR through GIZ to supply its products to Kakuma and Daadab refugee camps. They are very excited about this new venture as it targets over 400 families that are set to benefit.

Hailing Moto Poa, King'ori says, "Due to the availability of sugarcane locally, the energy is renewable and easy to access as a result of the numerous plantations across East Africa."

He however laments the cost of doing business in Kenya saying that the gel would have been cheaper were it not for the huge tax imposed on alcoholic products, which has made it almost impossible to import the oil from neighbouring Tanzania. "Technical alcohol is levied at a tax of 100 per cent, making it extremely expensive for use."

He is urging the government to relax the heavy taxation to pave way for the gel to be manufactured locally. This will not only translate to benefits to consumers by making them locally and readily available, but will positively impact on sugarcane growers.

CCL business development manager, Mohamed Kadhi says they are in consultation with key stakeholders including the ministries of Finance and Energy, as well as National Environmental Management Authority, who are all interested in their



products, as they are useful in energy conservation and reforestation measures.

The yellowish, sweet-scented bio-ethanol gel is both non-toxic and non-harmful to its users, as compared to firewood, kerosene and liquefied petroleum gas and is further mixed with lemon grass which serves as mosquito repellent.

"It ensures that the users are not exposed to the dangers of respiratory illnesses, which have become a common phenomenon, especially in poor and middle class households," says Veronica Muiya, a marketer with CCL.

With a clear blue flame, Moto Poa stoves do not soot cooking pots, hence leaving them in better condition and easy to clean. In addition they have no smoke, making them the perfect modes of food preparation in an environmentally friendly trend.

Due to its non-explosive nature, the gel is accredited for being safe for use by people of all ages. This dispels any would-be fears for parents in the event that they have to leave young adults in the house to prepare meals for themselves, unlike with liquid petroleum gases.

"Our products are cheaper than rivals in the market, but we still intend to make them more accessible," says Kadhi. One litre of bio-ethanol gel is equivalent in use to two and a half litres of kerosene.

The easy-to-use burners are imported from China, and are fitted with a regulator to control the heat. They come with enormous advantages like their high performance and being easy to clean as they can be dismantled and fixed without any specialised skill.

A fully fitted Moto Poa stove weighs 1.3 kilogrammes; this enables one to easily store it, and can further carry it along in the event that it is to be used for outdoor activities like picnics and camping.

King'ori is extending an olive branch to university students to try out this latest innovation, which he says is more eco-



1. Moto Poa stove and the gel
2. Veronicah Muiya, a Marketer for Consumer's Choice.
3. Andrew King'ori, Marketing and Distribution Manager Consumer's Choice.

nomical and less risky for hostel life.

A single burner cooker is currently retailing at Sh2,000, the two-burner going for Sh2,500, while the gel costs Sh165 per litre, and can burn for between four and a half to five hours. "You can cook just about anything on them, and have been proven to serve people well," says Veronica.

King'ori says his company is in plans to come up with an even cheaper jiko once duty is waived. He is hoping the government will zero rate both the gel and the stove, and make them more affordable to the public.

"With good interventions, we intend to roll out a campaign to give the stoves to people for free and only concentrate on selling the gel," says Kadhi, and adds that the more the numbers of people who adapt to the use of their products, the more the reclamation efforts of the fast-depleting forests.

This will further reduce respiratory ailments caused by solid fuels.

He further says the innovation has been



well received in the market, with hundreds of consumers reported to be using them.

They are given a free container of gel on every purchase of a stove as a starter kit. There are further discounts for people interested in buying the appliances in bulk.

Moto Poa is locally available in leading supermarkets in the country.