

TECHFOCUS

# Can Biodiesel mitigate global warming?

AHSAN HABIB SHIMUL

**B**ODIESEL is a completely natural, renewable fuel applicable in any situation where conventional petroleum diesel is used. The notion of bio fuel dates back to 1885 when Dr. Rudolf Diesel fabricated the first diesel engine with the full target of running it on vegetative source. In 1912 he observed, "... the use of vegetable oils for engine fuels may seem insignificant today. But such oils may in the course of time become as important as petroleum and the coal tar products of present time."

In 1970, scientists revealed that the viscosity of vegetable oils could be abridged by a simple chemical process and that it could perform as diesel fuel in modern engine. Since then the technical developments have come a long way and the plant oil today has been highly recognized as bio fuel, equivalent to diesel.

Latest environmental (e.g. Kyoto Protocol) and economic concerns have prompted renaissance in the use of biodiesel throughout the world. In 1991, the European Community proposed a 90% tax reduc-



than conventional diesel.

Biodiesel has good potential for rural employment generation.

**Plant sources for Biodiesel**

Under Bangladeshi conditions such plants varieties, which are non-edible and which can be grown abundantly in large-scale on wastelands, can be considered for biodiesel production. Some of the prominent non-edible oil seed producing plants include *Jatropha curcas*, *Pongamia pinnata* or *Karanj*, *Calophyllum inophyllum* or *Nagchampa*, *Hevea brasiliensis* or *Rubber seeds*, *Calotropis gigantea* or *Ark*, *Euphorbia tirucalli* or *Sher*, *Boswellia ovalifololata*, *Neem* etc.

Considering all the options available among non-edible Tree Bearing Oil (TBO) seeds, *Jatropha Curcas* has been identified as the most suitable seed. *Jatropha* is a genus of approximately 175 succulents, shrubs and trees from the family Euphorbiaceae. Plants from the genus are natives of Africa, North America and the Caribbean. Originating in the Caribbean, the *Jatropha* had spread as a valuable hedge plant to Africa and Asia by Portuguese traders. *Jatropha Curcas* is a widely occurring variety of TBO. It grows practically all over Bangladesh under a variety of agro-climatic conditions especially heavy rain-prone areas and Chittagong Hill Tracts, Sylhet and Mymensingh hilly regions are the good locations for *Jatropha* cultivation. Thus it ensures a reasonable production of seeds with very little inputs.

The advantages of the specie are as follows:

- *Jatropha* can be grown in arid zones (20 cm rainfall) as well as in higher rainfall zones and even on land with thin soil cover.
- It is a quick yielding specie even in adverse land situations viz. degraded and barren lands under forest and non-forest use, dry and drought prone areas, marginal

lands, even on alkaline soils and also as agro-forestry crops. *Jatropha* can be a good plantation material for eco-restoration in all types of wasteland.

- *Jatropha* grows readily from plant cuttings or seeds up to the height of 3-5 m.
- *Jatropha* is not considered good forage material.
- The plant is highly pest and disease resistant.
- Various parts of the plant are of medicinal value, its bark contains tannin, the flowers attract bees and thus the plant is honey production potential.
- *Jatropha* removes carbon from the atmosphere, stores it in the woody tissues and assists in the build up of soil carbon.

**Biodiesel Production**

Biodiesel is made through a chemical process called transesterification whereby the glycerin is separated from the fat or veggie oil. Once the glycerin is removed from the oil, the remaining molecules are, to a diesel engine, similar to petroleum diesel fuel. The process leaves behind two products - methyl esters (the chemical name for biodiesel) and glycerin (a valuable byproduct usually sold to be used in soaps and other products).

Expellers or continuous screw presses are used throughout the world for the extraction of oil from copra, palm kernels, peanuts, cotton seeds, flaxseed and almost every other variety of seed, wherever there is a large enough seed supply to justify a continuous operation. An expeller can exert much greater pressure on the seed cake than a hydraulic press can. This increased pressure permits the recovery of a larger proportion of the oil, about 3-4% of the oil is left in the cake with an expeller, compared to 4-6% with a hydraulic press. The expeller is an essential part of almost all modern oil seed

extraction plants. It is used both by itself and as a pre-press before solvent extraction. Expellers vary in size from machines that process 100 pounds of seed per hour, to machines that process 10 or more tons of seed per hour. Different types of oil expellers for *Jatropha* seeds are built in many countries.

Biodiesel technology providers worldwide are *Lurgi PSI*, *Superior Process Technologies*, *Biodiesel Industries*, *Cimbria Sket*, *Bratney*, *Crown Iron Works*, *Renewable Energy Group* etc.

**Storage**

In general, the standard storage and handling procedures used for petroleum diesel can be used for biodiesel. The fuel should be stored in a clean, dry, dark environment. Acceptable storage tank materials include aluminum, steel, fluorinated polyethylene, fluorinated polypropylene and teflon. Copper, brass, lead, tin, and zinc should be avoided.

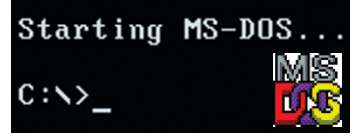
A 1998 biodiesel lifecycle study, jointly sponsored by the US Department of Energy and the US Department of Agriculture, concluded biodiesel reduces net CO<sub>2</sub> emissions by 78 percent compared to petroleum diesel. This is due to biodiesel's closed carbon cycle. The CO<sub>2</sub> released into the atmosphere when biodiesel is burned is recycled by growing plants, which are later processed into fuel. Is biodiesel safer than petroleum diesel? Scientific research confirms that biodiesel exhaust has a less harmful impact on human health than petroleum diesel fuel. Biodiesel emissions have decreased levels of polycyclic aromatic hydrocarbons (PAH) and nitrated PAH compounds that have been identified as potential cancer causing compounds. Test results indicate PAH compounds were reduced by 75 to 85 percent, with the exception of benzo(a)anthracene, which was reduced by roughly 50 percent. Targeted nPAH compounds were also reduced dramatically with biodiesel fuel, with 2-nitrofluorene and 1-nitropyrene reduced by 90 percent, and the rest of the nPAH compounds reduced to only trace levels.

References: [savoiapower.com](http://savoiapower.com) (Biodiesel: fuel produced from any vegetable oil), [tifac.org.in](http://tifac.org.in) (Biodiesel: Technology & Business Opportunities An Insight).

The author is a student of Biotechnology and Genetic Engineering Discipline, Khulna University.

MS-DOS

MS-DOS (for Microsoft Disk Operating System) is an operating system commercialised by Microsoft. It was the most widely used member of the DOS family of operating systems and was the dominant operating system for the PC compatible platform during the 1980s. It has gradually been replaced on consumer desktop computers by various generations of the Windows operating system. MS-DOS was originally released in 1981 and had eight major versions released before Microsoft stopped development in 2000.



TECHNEWS

## Google takes aim at fast e-mail for cell phones

REUTERS, San Francisco

**G**OOGLE Inc. aims to close the gap between the classic way people get e-mail -- sitting at a computer -- and the slow-as-molasses reality of receiving e-mail on cell phones, the company said on Thursday.

The Web search leader is introducing a custom version of its Gmail e-mail service that can run on any phone with Java software, or close to 300 different mobile phone devices.

"Because it is an application and not running through a browser... it looks and feels like Gmail on the desktop," said Tony Hsieh, product manager for the Gmail on mobile service.

Gmail for mobile, as the new service is known, promises computer-like response times for viewing e-mail. And it retains many of the features users expect when running Gmail in Web browsers on their personal computers, Hsieh said.

These include the ability to search through one's e-mail history, to organize e-mails according to conversation, and automatic synchronization so any e-mail read on the phone show up as already read when you sign on a computer the next time.

Initially, the service is available in the United States on



phones from Sprint Nextel Corp., T-Mobile and Cingular, which is a joint venture between AT&T Inc. and BellSouth. Google later plans to expand Gmail for mobile to other countries and languages.

The phones need to be able to run or support Java software, a programming language commonly used in cell phones to create games and other applications.

Gmail for mobile also allows phone users to receive docu-

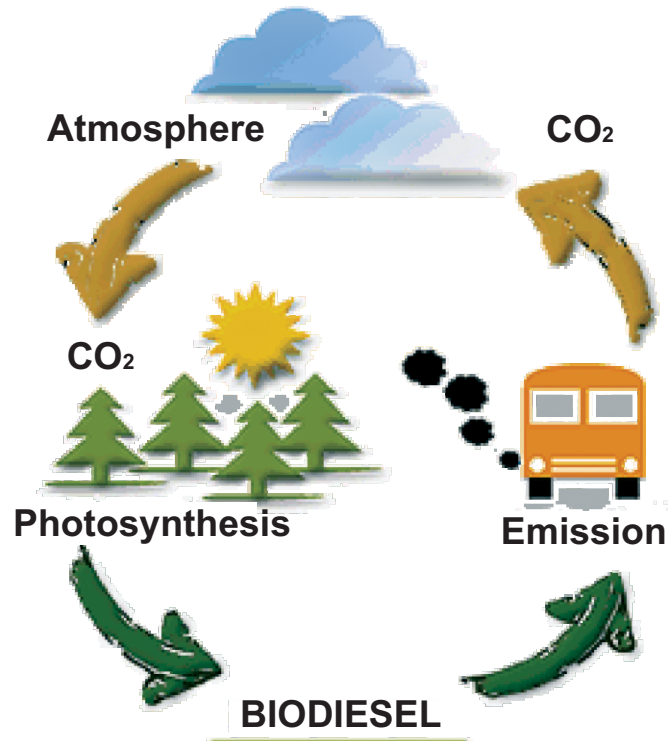
ment attachments, including Word or Adobe Acrobat files and photos, which are instantly viewable and automatically resized to fit the user's phone screen.

True e-mail obsessives have other options, but they are pricey and out of reach of most consumers. Millions of professionals have become instantly available via Blackberry phones. Millions more use more or less copycat e-mail services on smart phones.

Virtually all mobile phones sold worldwide for the past 18 months come with a Web browser. Just be prepared to wait 30 seconds to a minute to sign on and download each e-mail.

Users of Gmail, or rivals like Yahoo Mail, can already view their e-mail this way, but it's slow and hard to use.

Mobile users can go to <http://gmail.com/app> on their Java phone browser to download the application. Gmail for mobile is free of charge from Google, although data charges by phone carriers may apply for downloading lots of mobile e-mail.



tion for the use of bio fuels, including biodiesel. Today 21 countries worldwide produce biodiesel.

Advantages of biodiesel over conventional diesel

Biodiesel, derived from the oils and fats of plants like *sunflower*, *rape seeds*, *Canola* or *Jatropha Curcas*, can be used as an alternate or an additive to diesel. As an alternative fuel biodiesel can afford power similar to conventional diesel fuel and thus can be used in diesel engines. Biodiesel is a renewable liquid fuel that can be produced locally thus helping reduce the country's dependence on imported crude.

Biodiesel is non toxic & environmental friendly as it produces sub-

stantially less carbon monoxide and 100% less sulfur dioxide emissions with no unburnt hydrocarbons and thus it is ideal fuel for heavily polluted cities. Biodiesel reduces serious air pollutants such as particulates and air toxicity.

Due to its less polluting combustion, biodiesel provides a 90% reduction in cancer risks and neonatal defects.

Biodiesel is biodegradable and renewable by nature.

Biodiesel can be used alone or mixed in any ratio with conventional diesel. The preferred ratio of mixture ranges between 5 and 20%.

Biodiesel extends the life of diesel engines.

Biodiesel could be cheaper

PHOTOFACT

# Hubble

The first space telescope has transmitted more than 750,000 images

Hubble orbits the Earth every 95 minutes  
It has already travelled 4.8 billion kilometres

Antenna to transmit images  
Opening panel  
Mirrors  
Solar panels  
Camera (400 kg)

Position: 600 km high since 1990  
Weight: 11 tonnes  
Length: 13.2 m  
Diameter: 4.2 m

Equipment  
Since March it carries an ACS camera, which has improved the image capacity by 10

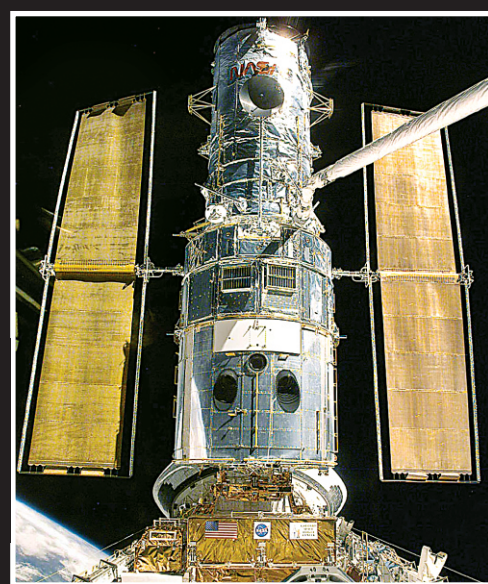
It can record images visible in normal light and in the ultra-violet and infra-red ranges

Cost: \$6 billion over 15 years

Even if NASA decides to abandon Hubble, it should survive until 2008-2009. Continuing to send maintenance missions would prolong its life for another 5 years

307006

AFP



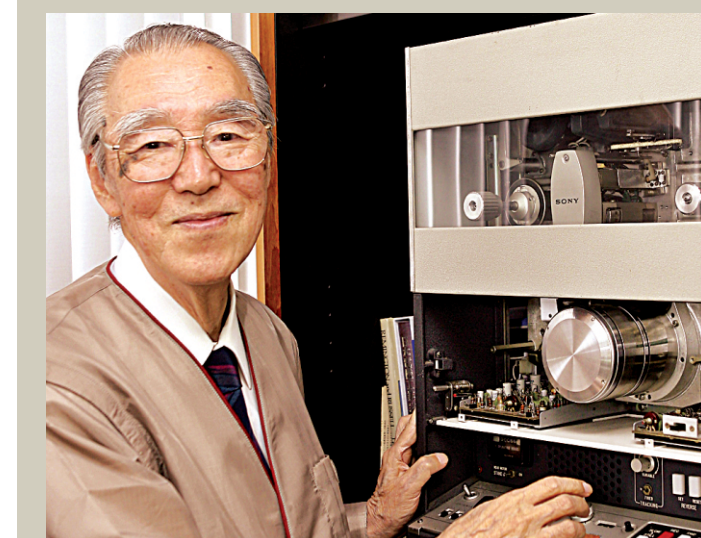
HUBBLE'S FATE

This NASA file image shows Hubble Space Telescope resting in Space Shuttle Discovery's cargo bay during the third repair mission in December 1999. NASA Administrator Michael Griffin announced plans for the fifth servicing mission to Hubble on October 31. Without the repair mission, which is likely to be carried out in 2008, the telescope would shut down in 2009 or even earlier.

PHOTO: AFP

TECHNEWS

## 'Mr Walkman' retires as Sony searches for new rhythm



"Treasury of Sony" Nobutoshi Kihara displays Sony's PV-100 video tape recorder, produced in 1963

AFP, Tokyo

**T**IMES have changed since Nobutoshi Kihara sketched out designs for the revolutionary Walkman on a piece of paper.

But, despite a disastrous few years for the iconic Japanese company, the ground-breaking Sony engineer believes the electronics giant still has its spirit of innovation as it marks its 60th anniversary this year.

A protege of Sony co-founders Masaru Ibuka and Akio Morita, Kihara is the little known face behind Japan's first magnetic tape recorders, portable tape recorders, music stereo systems, Betamax video

and digital cameras.

Kihara, who has slipped quietly into retirement after nearly six decades at Sony, also played key roles in improving the company's televisions and mini video cameras.

"We made good, quality products. Our founders also knew the importance of advertising and promotion. That's how the company grew," said the soft-spoken 80-year-old, dressed in a khaki engineer's uniform.

"We did not think about expanding the company for the sake of expansion. It just grew as we worked on our products," he told AFP before retiring as head of a Sony research center

where he spent his last working years.

"Back in my days, we had to draw product designs on papers. I would close my eyes and imagine our products. I would imagine joggers with Walkmans to see how the hinges should move or how the products fit into the lives of the users."

Proud to have been a Sony employee and former student of Ibuka, Kihara said he believes the company's rank-and-file engineers will keep pushing the technological boundaries.

"I am confident that our soul as engineers is being passed on to young people. Being unique and creative -- that's the quality of Sony," he said.

Few would dispute that the original Walkman, which went on sale in 1979, changed the way people around the world listened to music.

Ironically, however, US computer maker Apple trumped Sony in the market for new digital portable music players with its phenomenally successful iPod. Sony has also lagged behind rivals like Panasonic in super-thin televisions.

Sony has gone through a turbulent spell in recent years, including recalls of millions of its laptop computer batteries that have dealt a serious blow to its fragile recovery from a profit slump.

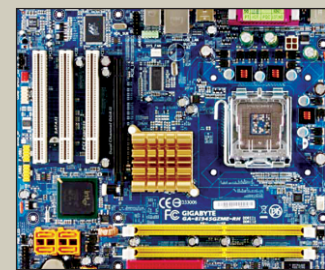
## Smart tech introduces green computing concept

STARTECH DESK

**F**OR the very first time in Bangladesh market, Gigabyte's sole distributor Smart Technologies (BD) Ltd. has introduced RoHS compliant motherboards, says a press release.

As a member of the global community to look after the environment, Gigabyte complies with the European Union's Restriction of use of certain Hazardous Substances (RoHS) directive which limits the use of lead, mercury, cadmium and other hazardous substances in electronic products.

From components and material selection to production processes, make up of accesso-



ries, packaging/color boxes etc; Gigabyte has carefully examined and designed this product to be 100% RoHS compliant. Gigabyte will continue to develop RoHS compliant PC components and commit valuable resources to promoting and advancing RoHS directive goals and objectives.

Windows Vista Ready Requirement: High Definition Audio and DirectX 9.0 VGA.

Leading the silicon process technology from 90nm to 65nm, the Intel new-generation CPU transistors deliver more energy-efficient performance than anyone. Based on the Intel's next generation Micro Architecture, the Intel Core 2 Duo processor with two cores and shared L2 caches provides the best capability-per-watt solutions. The cutting-edge processor the significant performance boosts and better energy efficient platform.