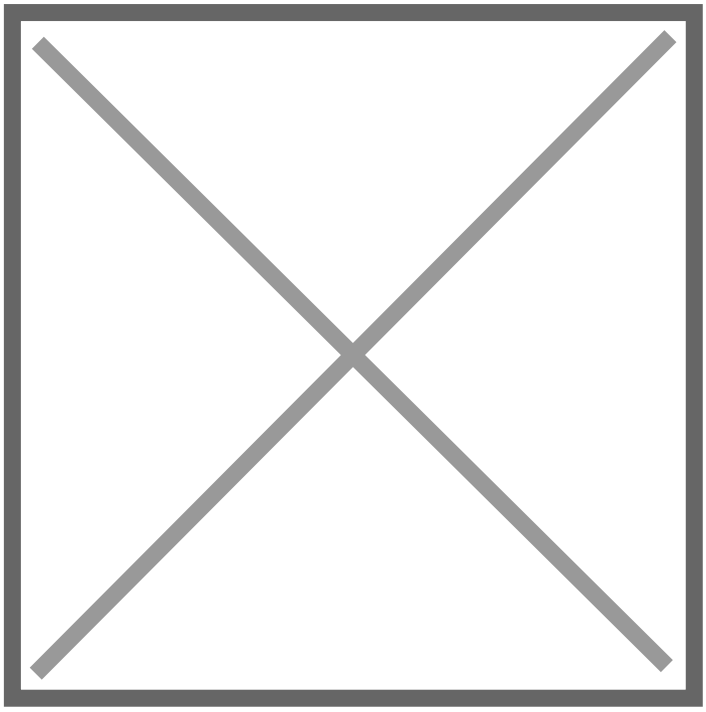
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Blending Ethanol with Diesel

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After the success of green and white revolutions leading to self sufficiency in food grains and milk production, the government is now looking at 'Krishna Kranti' (black revolution) to not only help India become self-sufficient in oil production but also provide a healthy environment to the people.

Blending ethanol with petrol has become a reality after nearly six years of study. The five percent ethanol-blended petrol is now available in nine states and four union territories. The government is extending this program to other states also.

In addition, it is actively looking at blending ethanol with diesel, as diesel alone constitutes about 80 percent of the automobile fuel consumed in the country today. The government has already sanctioned Rs four crore for the R&D studies, which are at an advanced stage, nearing completion now.

Train on track

The Indian Railways is also experimenting with the new eco-friendly "biodiesel" fuel to run passenger trains. The first successful trial run of a superfast passenger train was conducted on December 31, 2002 when Delhi-Amritsar Shatabdi Express used five percent of "biodiesel" as fuel.

Indian Railways would be able to not only save on its rising fuel bill but also control the pollution level. Sulphur and lead emissions came down significantly when biodiesel was used (biodiesel used to the extent of 10 percent mixture with the conventional diesel). The Railways' annual fuel bill of Rs 3,400 crore for using diesel could be reduced by nearly Rs 300 - 400 crore per annum by using biodiesel. Ultimately, the percentage of biodiesel would go up to 15 per cent as per the accepted global norms. It has already signed a MoU with ministry of petroleum and natural gas to grow Jatropa at 500 acres on its track.

Biodiesel can be produced from edible and non-edible oils through trans-esterification using ethanol or methanol. The properties of biodiesel are close to that of diesel fuel and in fact, it offers advantages in terms of emission control from diesel engines. In India the current assessments are based on non-edible oils for biodiesel production. Although methanol is preferred for transesterification world over, mainly due to cost advantage, but in India ethanol may be worth considering since we grow more of sugarcane.

This green fuel has high octane and lubricity and readily mixes with diesel without any engine modification. And automobile manufacturers like Mahindra and Mahindra and Ashok Leyland have endorsed biodiesel as a fuel for their vehicles. It also

scores in terms of availability and price. Biodiesel has already made headway in countries like US, European countries, Australia, Japan and Malaysia.

Taking the lead

Considering the scope of this new fuel, Mumbai-based Hindustan Petroleum Corporation Ltd (HPCL) has introduced biodiesel though a pilot project in association with Brihan Mumbai Electric Supply & Transport System popularly known as BEST in Mumbai. This joint project is mainly aimed at reducing the pollution levels in Mumbai. The project, first of its kind in urban transport, is in tune with HPCL's commitment to promote a clean and healthy environment.

Commenting on the pilot project Ashish Chemburkar, chairman, BEST committee said, "BEST has 25 depots; runs 3340 buses in 800 routes; and consumes 6750 kilolitres of diesel per month. Due to our continued commitment to reduce pollution in Mumbai, we introduced environmentally friendly buses fitted with CNG engines. As a next step we have decided to go for biodiesel."

DaimlerChrysler on Biodiesel

Its not only the Indian organizations like railways and HPCL even the world's oldest automaker DaimlerChrysler, has embarked on a project to prepare biodiesel from the extracts of Jatropha plants as a viable alternative to the conventional energy. It has been working on the project in association with the Hohenheim University, Germany, and the Council for Scientific and Industrial Research of India. It had established two small plantations on eroded land in two climatic regions- Orissa (sub-humid region) and Gujarat (semi-arid area). These Jatropha curcas oil seed tree plantations were expected to recover eroded soils and render them usable for agriculture purpose again as well as to produce oil that could be used for biodiesel production.

The five-year project was launched in 2003 and had been broadly divided into three phases. In the first phase a test drive of a Mercedes-Benz C-class car was run on the biodiesel for over 5,000 km and the results were encouraging in the reduction of pollution and the fuel's adaptability to different climatic conditions.

MB Lal, chairman and managing director, HPCL who took up the initiative of launching biodiesel said, "Of the 25 buses selected for the pilot project, five buses run on normal diesel, five with five percent biodiesel blend, five with 10 percent biodiesel blend and 10 with 20 percent biodiesel blend. The trials are conducted on Euro II and Euro I buses. The smoke and other parameters of emission would be checked. The total quantity of biodiesel required for three months trial is 20,000 litres. The cost would be Rs 15.7 lakh. As of now we procure biodiesel from Lubrizol India Ltd made from non-edible oil of Karanjia. As per requests from BEST we are extending the project for six months."

Besides HPCL, the research and development wing of Indian Oil Corporation (IOC) at Faridabad in Haryana is also exploring the possibilities of doping diesel with five percent biofuels (oil extracts from jatropa curcas, mahua, karanjia, sunflower seeds and rapeseeds). The IOC is also planning to launch a trial run of buses on biodiesel. For this the IOC is looking at Haryana Roadways. About 450 kilolitres of bio-diesel would be used in the pilot project.

The necessary support

The success of any program depends on the government's initiative, support and implementation of the policies. And fortunately this program has been endorsed and well supported by the government. Ram Naik, union minister for petroleum and natural gas of the outgoing cabinet had said, "The ministry of petroleum and natural gas is involved to the extent of blending biodiesel in diesel. We have already taken up the issue with the Bureau of Indian Standards and got the specifications of diesel modified to incorporate oxygen content of six percent thereby paving the way for blending of biodiesel. To stop poor quality of oils being passed off as biodiesel, standard specifications for the product are required to be formulated. This needs to be done before a large-scale biodiesel program takes off in the country."

Even the Planning Commission has recommended setting up a national mission on biodiesel. A task force of the Planning Commission has proposed that oil extracted from the Jatropa curcas plant be mixed with diesel to bring down emission levels. Dr DN Tewari, who heads the task force, revealed that the diesel blend is estimated to cost Rs 14 per liter and will be EURO III compatible. It observed that the communities in Bastar in Chhattisgarh have been using this oil to run farm equipment and motorcycles for years. Studies indicate that this extract is superior to both petrol and diesel and engines need not even be modified to run on this fuel.

The ministry of petroleum and natural gas has planned to adopt a strategy; first it has decided to start a pilot project at Mumbai (project launched last month) and Rewari in Haryana to see the impact of biodiesel-blended diesel on vehicles in Indian conditions. With the thrust given to the renewable fuels, former union minister Ram Naik observed, "the Indian agriculture will respond to the challenges and as with the green and white revolution. We will see a black revolution leading India to the path of self-sufficiency in oil. These fuels will benefit the farmers apart from reducing the foreign exchange burden on import of crude oil and also benefit the environment in major cities."

The union ministry of rural development, the designated nodal ministry for the implementation of the program, has already initiated a scheme for the development of wastelands through plantation of trees and herbs having oil-bearing materials. The petroleum ministry has signed a MoU with the Indian Railways for encouraging plantation of Jatropa in 500-hectare area along the railway tracts.

An avenue to look at

The alternative fuel is not only eco-friendly but also provides a renewable source as it is extracted from a plant. Its use would help bring down the emission levels and re-deploy the surplus manpower and contribute to environment protection. The plant can easily be grown as it adopts itself well to arid, semi-arid conditions and demands low fertility and moisture. The other advantages are the fuel's contribution to national energy pool and the potential of job creation in the rural sector.

The oil majors have already taken the lead in introducing biodiesel. The results of the pilot trials would give greater impetus to the program and contribute significantly towards the environment, agriculture, infrastructure development and job opportunities. The states-Rajasthan, Uttaranchal, Chhattisgarh, Gujarat, Madhya Pradesh - which used to reel under drought/ wastelands/ large biodiversity, have to look at biodiesel as a new avenue to attract investments. This will achieve livelihoods for millions and green cover for wastelands.

It will be a win-win option for the state governments, firms and the common man.

Narayan Kulkarni

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