



Green Schools Network

APRIL 2006



Why talk about Biofuels?

The eight richest countries in the world met last-month to discuss their future economic strategies. And do you know what was the top most issue on their agenda? Looming energy crisis. Yes, the world leaders are at their wits' end about the way erratic gas supply is affecting global economy. But the panic is rising not only because of that. A lot more is at stake here. Fossil fuels like oil, coal and petroleum spew out carbon di oxide and other green house gases into the atmosphere. And these gases are slowly destroying Nature's delicately balanced climate system. No wonder everyone is now desperately looking out for alternatives.

Name

Class Date

Activity: In a city like Delhi, the main source of air pollution are the growing population of vehicles. On an average 200 cars and 150 two-wheelers get registered in Delhi everyday! Is there any system to monitor their emission levels? You must have heard about the Pollution Under Control Certificate (P.U.C.C). Ask your parents for the P.U.C.C of your vehicle, if you own one. Or else try to get one from a vehicle owner in your locality. Look for the following:

a. What are the pollutants being checked?

b. Which Department of the government is issuing the certificate?

c. What are the permissible limits of each pollutant?

d. Go to the nearest petrol pump and locate the pollution-checking booth. Chat with the person who tests the vehicles. Take a look at the monitoring machine. Where was it manufactured? What all pollutants does it check? Is the test done properly?

e. Find out what happens to the vehicles which fail the test?

g. Look out for stickers with Euro II or Bharat II written on them. What do they mean?



Hi!

I am Pandit Gobar Ganesh.

You will find me in Gobar Times—a magazine that tells you how your everyday life is linked to the world around you. Hooked, huh? If you want to know more about me and GobarTimes visit us at www.gobartimes.org

GT-GSP Priviledge offer

The members of GT-GSP Network can now get 3 extra copies of Gobar Times with Down to Earth, for distribution and use in eco-club activities. All you have to do is mail this advertisement along with the Down to Earth subscription note.

Biofuels: Grow-your-own fuel

What are the options available to us? While major research projects are in full swing in different parts of the world, bio-fuels are fast grabbing the attention of the world community.

WHY ARE THEY BETTER ?

These plants can grow on poor soils/require very less water/water

Produced from plants, crops and feedstock

PLANTS PROCESSED INTO BIOFUELS

Emissions from biofuels are less toxic than fossil fuels

Can grow on wastelands and provide employment

The left over plant masses after processing can be recycled as fodder or as fertilizers.

But...beware of the pitfalls

Sound like wonder oils, don't they? But if we are to go the biofuel way in India, we need to tread carefully. Why?

Because land is at a premium in India. Every patch of soil is used here—either for crops, or to grow fodder. Even the driest, most infertile tracts provide livelihood for communities, who literally live off these lands. So on whose land will these oil-yielding varieties be grown? Because biofuels are already being seen as a hugely profitable venture by the industries. And they are out to grab lands in states with large stretches of 'wastelands', like Chattisgarh. This may spell doom for our farmers and shepherds who earn their *roti* from these seemingly useless tracts.

The challenge will be to ensure that industries—lured by the oil-producing plants—don't jump into the bandwagon and bypass the local communities!

NOW, LET ME TELL YOU ABOUT A COUPLE OF THESE VARIETIES THAT ARE NOW BEING TRIED OUT IN OUR OWN COUNTRY.

Gobar Gyan

Jatropha-liquid gold: The seeds of a plant called jatropha (*Jatropha curcas* to scientists; *ratanjyot* in Hindi) and pongamia (*Pongamia pinnata*; *karanj* in Hindi) yield oil that, after processing, makes biodiesel. The system of production is simple. Oil is extracted and put through a process called transesterification (to convert it to fatty acid esters, the chemical description of biodiesel, by incubation with alcohol and alkali); this makes it a suitable blend for petroleum-derived diesel. The jatropha blend reduces greenhouse gas emission by half. Scientists claim that as the conversion process improves with time, emission level will be zero!

Jatropha is also ideally suited to India. Why? Because it is a hardy plant that can to grow in abundance in dry, arid zones. In other words, the lands that cannot be used for growing crops can be reclaimed and a solid farmer production base can be built up.



Activity: 1. Find out if the state forest department can supply jatropha saplings to your school? Which other agencies are providing jatropha seedlings?

2.. Identify a space in your school compound where you can plant them. Remember, Jatropha does not need a lot of water, nor does it require constant tending.

Gobar Gyan

Ethanol-tasty car punch: It is made by fermenting molasses or *gurh*, a product of sugarcane. Ethanol, $\text{CH}_3\text{CH}_2\text{OH}$, is an alcohol, a group of chemical compounds whose molecules contain a hydroxyl group, OH, bonded to a carbon atom. Ethanol melts at -114.1°C , boils at 78.5°C , and has a density of 0.789 g/mL at 20°C . Its low freezing point has made it useful for low-temperature purposes, such as for anti-freeze in automobile radiators. It has been made since ancient times by the fermentation of sugars. Zymase, an enzyme from yeast, changes the simple sugars into ethanol and carbon dioxide. Starches from potatoes, corn, wheat, and other plants can also be used in the production of ethanol by fermentation. However, the starches must first be broken down into simple sugars.

Ethanol is easily blended up to at least 10 per cent with modern conventional gasoline vehicles, and to much higher levels in vehicles that have been modified to accommodate it. The Indian government launched a programme to promote ethanol-blended petrol in 2003. Besides providing a source of less-polluting fuel, this is designed to help sugar-cane farmers to get better returns from the fields.

Activity: Make Biofuels in your school laboratory. Know how. Visit http://journeytoforever.org/biodiesel_make.html#start

Find out if there are any vehicle manufacturing companies in India, which are producing vehicles, which run on fuels other than petrol, diesel and CNG? Name the companies.

Find out if the emissions from conventional fuels and biofuels differ?

Collect information about the various aspects of alternative fuels. Search the web and newspapers. Put up stories on the school notice board.

Find out more about biofuels? What is their origin? How are they made? Compare it to Petrol Diesel? How about a match between 'the Petrodiesel Bulls' and 'the Biofuel Knights'?

Petrodiesel Bulls

Hi! We are the Petrodiesel Bulls. We are the great adventurers and historians. Coming right from the center of the earth- were writing history for a million years. Our team consists of 1. Petrol 2. Diesel

3.....4.....5.....
.....

6.....7.....8.....
.....

9.....10.....11...
.....

Origin:

We are made of:

We are found in raw form in:

Our emissions include:

We would be helping mankind for (tick whichever is applicable)

- a) Another 20-30 years
- b) Forever

Biofuel Knights

Hi! We are the biofuels.

.....
.....

Our team consists of 1.

2.....
3.....4.....5.....
.....

6.....7.....8.....
.....

9.....10.....11...
.....

Origin:.....

We are made of:

We are found in raw form in:

Our emissions include:

We would be helping mankind for (tick whichever is applicable)

- a) Another 20-30 years
- b) Forever

GT-GSP NEWS

Jawahar Navodaya Vidyalaya, Meerut – First school to submit the complete report

JNV, Meerut is the first school in the network to submit the complete report of the school. The coordinator N.P. Singh is now busy making the final corrections in the report.

Water report submitted
'KV No. 3, BRD Pune has collected the relevant data regarding the water chapter and have submitted the report. Sandhya Jadhav, TGT Biology is coordinating the project in the School.'



Sanskriti school managing waste using three dustbins

*Sanskriti School, New Delhi, while submitting the data for the waste chapter have reported that they are using three dustbins in the school.
Blue – Paper
Green – Biodegradable
Red – non-biodegradable*

It is for the information of all schools that some of the copies of the manual have an error. In the waste disposal section of the waste chapter, silt and mud have also been included, it may be noted that silt and mud are completely reusable materials.

Some schools have sent us reports without the rainwater harvesting calculations. All Green Schools should note that even if you are not doing rain waterharvesting in your school - please do the harvesting potential calculations. The calculations woud come handy if the school plans to take rainwater harvesting sometime later.

The Burden of Fossil fuels : *The economics of it*

Activity : Ask your mom or dad about the rate of petrol/diesel ten years before? Compare the rates and interpret changes if any. If your parents cant give you an idea, talk to your neighbours, who owned a vehicle in 1995. Or better still talk to a petrol pump owner.

Fuel	1995 (Rs/litre)	2005 (Rs/litre)	Difference
Petrol
Diesel

What does the data from the table, tell us

Find out the major crude oil fields in India? Talk to your geography teacher.

Find out how much do we produce and how much do we import? Which countries do we import from? Gauge the transportation cost of crude oil from that country to India?

Do you think biofuels could be of help as far as import and transportation is concerned? How?
