Students make the best of this test

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Teamwork triumphs in car's 'green' conversion

By Kathleen Moore, Globe Correspondent | March 25, 2010

DOVER — In outward appearances, the 1990 Mercedes-Benz sedan parked outside Dover-Sherborn High School is just another well-preserved classic. Its white paint is unblemished, its blue leather seats are intact, and its engine purrs like a kitten.

But for science teachers Elizabeth Friedman and Nick Grout, it has been something of a mobile learning lab, teaching valuable lessons about sustainability, practicality, and the contributions that individuals can make to the bottom line.

Its magic, they say, is in the fuel tank.

"It runs on vegetable oil,'' said Grout, a science and technology teacher. "After we converted it, the kids nicknamed it 'The Green Monster.' ''

Funded by a $6,000 grant from the Dover Sherborn Education Fund, the car's makeover from diesel fuel to vegetable oil was a practicum undertaken by 36 students in Grout's "hands-on'' technology class and Friedman's more "bookish'' environmental research class.

Though it has 235,000 miles on it, the vegetable-oil-powered Mercedes maintains the same fuel economy (20 miles per gallon) as its fossil-fuel predecessor. It's the cost of the new fuel that is jaw-dropping.

"It's free,'' said Grout. "Basically, it's the same oil that restaurants get rid of once they're done frying, so if you arrange things with a local restaurant, you can get it for free. The only thing you have to do is filter it,'' he said. The Green Monster has a filtration system. "There's also this company in Leominster that will sell it, filtered, for $1.70 a gallon.''

The basic blueprints for the Green Monster's transformation were laid out in a $1,500 kit produced by a Holyoke company, Greasecar Vegetable Fuel Systems. Established in 2000, the company has sold more than 6,000 kits, 1,000 of which are in use in New England.

"The system is very straight-forward to use once you put it in,'' said Greasecar's operations manager, Rick Sustache. "We have directions, but installing it can be a little tricky, so we have a list of approved installers across the country who can do it in about eight hours.''

Armed with the printed directions, the Dover-Sherborn students tackled the transformation over the course of five weeks. While one group tinkered with fuel lines and electronics, another researched alternative approaches to engineering snafus. A third group took notes, which will be compiled into a manual for future students. A fourth group, working with media teacher Mike Sweeney, filmed the process for a training video, which is now in the editing stages.

"There were times when I'd see one kid under the car, having a problem, and he'd ask another kid to go research some solutions,'' said Grout. "It was great because some kids, they are really good at research and writing, and others love to get in there and work under the car. They all had some part of the project. And they were all working together.''

Friedman smiled at Grout's description.

“Students know a lot about what it means to be green. It’s everywhere in our pop culture,’’ she said. “But I don’t think they understood how to implement green ideals and live a green life. This shows them there’s a simple, inexpensive way to embrace that philosophy.’’

Like all gasoline- and diesel-fueled vehicles, the Greasecar system emits carbon dioxide, a gas that promotes atmospheric warming. But it earns environmental accolades for two reasons, Friedman points out.

First, it is a renewable resource that does not release carbon already sequestered in the environment. Secondly, the production of vegetable oil requires the cultivation of plants that metabolize carbon dioxide as a part of the natural photosynthetic process.

“The CO2 released by the combusted oil is offset by the plants,’’ Friedman said. “So the net effect is zero.’’

Several students were surprised by the environmental impact of this simple technology.

“I’ve always been interested in sustainability, so I signed up for this environmental science class so I could look at the big picture. I ended up under a car, covered with grease,’’ said Alec Larson, 18, a senior who plans to study politics at Hampshire College next year. “Basically we went from doing research on sustainable transportation to going ahead and working on the car. It all translated.’’

The Green Monster looks and acts like its gasoline-powered cousins, but it does have some quirks. For instance, the vegetable oil coagulates in colder temperatures, and could clog the engine’s combustion system. To prevent this, a switch clears the oil out of the fuel lines at night, replacing it with a small amount of diesel fuel that is used to start the car and warm up the engine. After that, another button switches the fuel supply back to the vegetable oil.

Vegetable-oil-fueled cars have about the same fuel economy as conventional vehicles, and the fuel tends to be cheaper, but locating a supplier can take some creativity.

Increasingly, Grout said, restaurants are not giving away their cast-off grease. They are selling it to recyclers, like SmartFuel or the Leominster company Collard Industries, which filter it and sell it to car owners.

Even with the extra marketing layers, vegetable oil fuel is cheaper than petroleum-based options. And for anyone concerned about the long-term costs of fossil fuels, it’s a steal.

“With this car, we are using renewable resources,’’ said Larson. “That makes so much sense to me.’’ ■