

These cars not blowing smoke on energy solution

YOUR ENVIRONMENT

By Lisa Lillelund

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There is no silver-bullet solution that will solve our ever-growing need for energy.

The 230,00 million or so vehicles on the road in the United States need to be powered somehow and many of our global neighbors in third-world countries are just beginning to be able to purchase their first car so the numbers of cars on the road will only rise each year.

Electricity needs in homes, offices, and factories around the world are growing exponentially each day.

Since we Americans are the biggest per-person polluters, I think we should contribute new solutions to making cleaner forms of energy. Our more waste-conscious friends in Europe are leading the way and in China and India serious research and development is taking place for clean energy technology. Here in the United States there are a couple of exciting inventions and initiatives taking place that I am happy to tell you about.

On Monday, Aug. 11, the Hydrogen Road Tour arrived in Massachusetts as part of a 13-day, cross- country trek with 31 stops to showcase this clean and innovative way to power cars with hydrogen instead of gasoline.

Hydrogen itself gives off zero carbon emissions and the only related pollution is in the production of hydrogen similar to the making of other fuels and by products.

Powering cars with hydrogen could enable us to reduce our greenhouse-gas emissions by more than 50 percent.

Are hydrogen-powered vehicles a thing of the future or something we can use today?

The technology is already in place and ready to go as I saw when the eight automobiles from manufacturers BMW, Toyota, Volkswagen, Hyundai-Kia,

Nissan, Mercedes, and Honda drove into the parking lot of the Volpe National Transportation Systems Center in Cambridge.

Now the fact that American car manufacturers were not present for this innovative event made me sad since I grew up in Michigan and want GM and Ford to succeed. I did learn that GM is well on its way with hydrogen cars, has 100 hydrogen vehicles in use and will join the tour later. Let's hope that Ford and GM have some good plans for electric, hybrid, and hydrogen vehicles in their future product offerings.

So what is holding us back?

Well infrastructure for one. Californians and Governor Schwarzenegger are leading the way to allow the growth of hydrogen-powered vehicles by opening hydrogen-fuel stations throughout California. We may be behind our green-minded friends on the West Coast, but thanks to Governor Patrick's administration and many excellent business leaders in Massachusetts, the growth of the hydrogen industry and local job opportunities are expanding each day. The National Hydrogen Road Tour made a refueling stop in Billerica to celebrate the opening of the first hydrogen refueling station in Massachusetts located at Nuvera Fuel Cells.

Here in Massachusetts we can be proud that we have the highest density of hydrogen and fuel-cell organizations in the country. We are tapping into lots of brain power and skilled personnel thanks to the universities, research organizations, venture capital support, advanced-technology companies and clean-technology initiatives.

In 2004 the Massachusetts Hydrogen Coalition, www.massh2.org, was formed and local Hamilton resident Brad Bradshaw is the Coalition President. Headquarters for the Hydrogen Coalition are at the Cummings Center in Beverly. As reported by the coalition, "The mission of the Massachusetts Hydrogen Coalition is to significantly increase jobs and investment in the hydrogen and fuel-cell industry by promoting our members and their capabilities throughout the world. The industry actively participates in hydrogen generation, storage and distribution as well as micro-fuel cells, portable power, stationary power and transportation."

So how is hydrogen made and how can it power cars?

Since I am not technically inclined, I had to ask the presenters and car manufacturers at the Hydrogen Road Tour several questions. Three participants in the road tour, Patrick Serfass of the National Hydrogen Association, Catherine Dunwoody of the California Fuel Cell Partnership and

Mario Masche of BMW were especially patient with those of us who are not rocket scientists or from the hydrogen industry.

As pointed out in the literature, which can be found at www.fuelcellpartnership.org, "Hydrogen, H₂, is the most abundant element in the universe. In nature, however, it is always bonded to other elements forming water, natural gas and other fossil fuels. Hydrogen can be found in plants and even in garbage. To produce hydrogen, we unlock the chemical bonds in the molecules." Turns out that we produce most of our hydrogen today, around 9 million tons total are made in the U.S., from natural gas but that many other local resources can be used.

To me the most exciting quality of hydrogen, besides the fact that it burns clean with no emissions, is that it can be made from local renewable sources of energy with almost no environmental impact. Examples of this include cities using yard clippings to produce hydrogen and waste from waste-water treatment plants to produce hydrogen.

In simple terms, the way that hydrogen fuels a car is to provide electric power to both a regular car engine and to an electric car engine through fuel cells located under the hood linked to a hydrogen storage tank in the back of the car. A proton exchange membrane (PEM) fuel cell combines hydrogen fuel with oxygen from the air to generate electricity. Fuel cells are very effective in providing power to forklifts, airport tugs and even space shuttles.

Next year Massachusetts will welcome a hydrogen-fuel-cell bus to join its transportation fleet at Logan Airport. California already has several fuel-cell cars and buses on the roads and countries like India and Italy are embracing this clean technology. Lots of exciting potential for using renewable resources and cleaner energy in place of petroleum. I hope that America's policy makers, business leaders, and voters have the long-term vision and short-term sense of urgency to support clean-energy sources such as wind, hydrogen, solar and biomass.

Lisa Lillelund is a regular columnist with the Beverly Citizen. She welcomes your comments at lisa@mangonetworks.com.