

250mpg? Bellevue auto visionaries say it's possible

Flywheel engine would be key

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Some owners of hybrid cars such as the Toyota Prius and the Honda Insight love competing to get 40, 50 or more miles per gallon.



Those numbers just bring an amused smile to Ed Furia's face.

Laurie Westdahl and Ed Furia with the concept car that would hold the flywheel-hybrid engine their company is developing. Westdahl designed the car, and Furia is CEO of AFS Trinity Power Corp. The company is seeking an automaker to collaborate with -- and \$120 million in financing.

"Do you think they'd like getting 250 miles per gallon?" demanded Furia, chief executive of Bellevue-based AFS Trinity Power Corp. "Hell, yes! They'd go to the gas station every two months!"

That mileage is possible, according to the animated former Philadelphian and his 20-person company, with cars called plug-in hybrids.

Now seeking an automaker with which to collaborate -- plus \$120 million in financing -- Furia said his Extreme Hybrid, which uses a flywheel to create and store power, is two years away from being prototyped and five years away from commercial availability.

Talks are under way with two venture capital firms and one automaker, all of which he declined to name in a recent interview.

The company has made rosy predictions about its technology before. In 1992, it said working flywheel-based cars would be available to test within two years. That still hasn't happened. In the early 1990s, automakers spurned flywheel technology as unproven.

But now, gas is expensive, worries over the environment are growing, and automakers can't meet the demand for hybrids. So Furia thinks his time has finally come.

Plug-in hybrids are aerodynamically efficient cars with three power sources: a small internal combustion engine, a bank of batteries, plus either a flywheel or a capacitor. Electronics shift the power load among those sources.

Flywheels, the company's specialty since its inception 15 years ago, are rapidly spinning metal disks that perform the same function as batteries. They provide and absorb power more quickly and efficiently than chemical batteries.

Technology protected by a 1992 patent will use flywheels in two ways: first to help accelerate vehicles, then to absorb the power created by their braking. That will take a critical load off the batteries, allowing the use of smaller, lighter cells and greatly extending their life.

The powerful, lightweight lithium batteries will charge at night, using the lower-cost power available during off-peak hours. The cars wouldn't have to be plugged in -- just pulled up to within a few inches of an inductive coupler, which passes current through the air.

If a sufficient number of plug-in hybrids were in use, they could even help stabilize the national power grid, Furia said.

Only for rides that would exhaust the batteries would the engine be required at all.

When technology allows, the engine could be replaced with a hydrogen-based fuel cell. General Motors is currently testing a fleet of fuel cell-equipped vehicles in Washington, D.C.

With the hybrid-vehicle market estimated to be worth \$1.3 trillion in 2016, Furia said there's "a big, big upside" in making just \$250 per car for licensing the company's technology -- preferably to every automaker in the world.

He said he's unaware of any other company pursuing flywheel-based vehicle drivetrains.

AFS Trinity, which has never made a profit, already generates \$3 million to \$4 million in annual revenue, mostly by selling flywheels to NASA, the Navy and the U.S. Department of Transportation. The company also makes flywheel-based uninterruptible power supplies, which keep corporate computers up and running during brownouts and outages.

That business kept the company going until the dot-com crash, when computer sales plummeted. Furia, 63, a lawyer and former regional administrator for the Environmental Protection Agency, had always dreamed of using the devices in passenger vehicles. So that's where the company turned its attention next.

"It's not just a matter of making money. We need to do this as a species," he said. "We're headed for a very bad place, including potential conflict with China over oil supplies."

China is building a 52,000-mile superhighway system, capable of transporting 1 billion people. Twenty years ago, it used 2 million barrels of oil a day. By the end of last year, it was using 6.5 million barrels per day.

In this country, fuel to propel the average conventional U.S. car for one week costs \$36. The Prius uses \$14.40 worth. The Extreme Hybrid would cost \$7.02 -- \$2.81 for gas and \$4.21 for electricity.

Hybrids, first introduced in 1997 in Japan, represented less than 1 percent of the 17 million new vehicles sold in the United States in 2004. But their time could be arriving.

Nissan recently said it will built its first hybrid Altima at one of its two U.S. factories starting late next year, following Toyota's decision to build a hybrid Camry sedan in Kentucky. Lexus just began selling its RX 400h SUV hybrid.

Among American nameplates, Ford Motor Co. has said hybrid versions of its upcoming Ford Fusion and Mercury Milan sedans will be on the road within three years. It already builds its Escape hybrid in Kansas City, Mo. General Motors Corp. has said it plans to introduce a hybrid Chevrolet Malibu in 2008.

Emissions rules in California, which accounts for 12 percent of U.S. vehicle sales, require the six largest carmakers by sales volume to offer low-pollution vehicles such as hybrids in the state by 2007.

If extremely efficient hybrids, like that proposed by AFS Trinity, were to make up 68 percent of the U.S. vehicle market by 2016 -- an unlikely but possible occurrence, according to the company's models -- U.S. oil imports from the Middle East could be eliminated.

"We're talking about replacing OPEC with the U.S. power industry," Furia said.

Not everyone thinks plug-in hybrids are the answer to environmental woes, though. Dan Becker, head of the Sierra Club's global-warming program, worries that they may substitute addiction to one polluting fuel for addiction to a more polluting fuel.

He told The New York Times in April that coal is more polluting than gasoline and that nearly 60 percent of this country's electricity is generated by burning coal.