



It's No Mr. Fusion, But Sefton Motor Uses Almost Anything For Fuel



There's a scene in the Back to the Future movies where "Doc" Emmett Brown feeds trash into his "Mr. Fusion" to power his time machine.

Apparently, to Mr. Fusion, the fuel doesn't matter.

Tim Sefton uses Mr. Fusion as an analogy to describe the Volo One Engine he's developing at his Sefton Motors Inc. Anything that will generate heat will power the Volo One—natural gas, a wood fire, a solar thermal collector, even waste heat. And the small, portable engine will take that heat and make a kilowatt of electricity out of it—at prices competitive with solar power.

For all its futuristic appeal, the Stirling engine is nearing its bicentennial—it was invented by a Scottish clergyman, the Rev. Dr. Robert Stirling, in 1816, in part as a safety improvement compared to the steam engines of the time, whose boilers were prone to explosion.

Sefton got interested in Stirling engines after a 25-year career in engineering and the internet. A New York native, Sefton came to Detroit in the late 1980s to work at Chrysler Corp. after getting a mechanical engineering degree from the University of Colorado. He later worked for a simulation software and consulting firm VSA, the broadband provider Saavis, and founded an internet telephony company, invivo, before founding Sefton Motors in 2013.

"I came upon these engines online," Sefton said. "I built a prototype and was amazed at how it worked. You just get it

hot and it starts running—nothing going in, nothing coming out."

Well, except for mechanical motion that can be transformed into electricity.

The Stirling engine works by expanding hot air pushing a piston in one direction, and contracting cool air pushing it back the other way. All you need to do is put the "hot end" of the engine close to a heat source, and the engine runs.

"It's very energy efficient, but it has some drawbacks," Sefton said. "It does take a while to warm up—you don't just step on the gas, so it's not suitable for automotive. It's more for a steady-state application. And that means that for generating electricity, it works really well... It's very low maintenance. There are only two sealing surfaces in the entire engine, and no valves."

A modest Kickstarter crowdfunding



campaign got Sefton Motors off the ground, and now the company is seeing its first sales. Fabrication of the parts for the six-foot-long, 250-pound Volo One engine takes place at the Allen Park maker space TechShop, while assembly and

testing takes place in Sefton's garage. Each engine—retail price, \$1,395—generates about 1 kilowatt.

The first customers?

"There's a guy in New Zealand who runs a fertilizer plant," Sefton said. "He wants to reclaim some of the energy from the wasted heat in his plant. There's a guy in the U.K. who I think just wants to test it out. And there's a guy in Texas who drills oil wells. He wants to use the methane coming out of his wells as fuel to power the engine."

Sefton is also working on a solar-powered front end for the Volo One that will concentrate the sun's infrared rays into heat to power the Stirling engine, while the visible light of the sunshine is converted into electricity by photovoltaic cells. The company's website, www.seftonmotors.com, shows the design.

Sefton says he's expecting to sell 40 units in 2015 and 200 units in 2016.

Eventually, he said he believes Stirling engines will have widespread application for off-the-grid users or those simply interested in a grid backup system that's easy to maintain and use. Not to mention possible applications in areas of the world where a power grid barely exists or is unreliable.

"We think the same thing can happen with electricity as happened with cell phones and the wired phone network," Sefton said. "Instead of a centralized system with a grid, we see a decentralized system where you have your own power plant at your house, and you can use any fuel you want to run it."

Just like Mr. Fusion.