

Israeli car engine could halve fuel costs, emissions

Aquarius's new take on internal combustion engines will be the big leap forward that vehicles need, says company founder

BY DAVID SHAMAH | April 27, 2016, 2:01 pm |

The notoriously conservative car business – autos, after all, are still largely powered by the internal combustion engine, developed nearly 150 years ago – is in for big changes, according to Gal Fridman, chief marketing officer and co-founder of Aquarius Engines.

“Our enhanced engine design uses energy much more efficiently, and eliminates the valves and rods that cause energy loss,” he said. “If a car equipped with a modern standard internal combustion engine can go about 600 kilometers on a tank of gas, ours can more than double that.”

Founded in 2014 by Fridman, CTO Shaul Yaakoby and CEO Ariel Gorfung, Aquarius is the latest challenger to the hegemony of the internal combustion engine – the piston-driven machine that generates energy to turn wheels and open and close valves, providing the power that enables a several-ton hunk of steel, aluminum, and plastic to move.

Developed over a number of years in the mid-1800s, the internal combustion engine was first patented in 1860, and was in commercial production by the early 1900s.

“Over the years there have been incremental changes in IC engines, with the most recent innovation the development of the turbo engine, which uses air to pressure and power,” said Fridman. “But those have been very incremental, nothing like our take on engine technology in the Aquarius engine.”

Instead of the 4, 6, or 8 pistons that thrust up and down to turn the valves that move the wheels, the Aquarius engine features a horizontal-moving cylinder that generates energy to power two electric generators that power the car. The result is a much smaller engine without the thousands of complicated and hard-to-replace parts in standard engines; a small, efficient power-generating machine with fewer parts to wear out, and fewer parts to distribute energy to – meaning that there is less chance for the energy to dissipate, said Fridman.

“The Aquarius converts the piston’s movement into energy, which is immediately transferred to the electric generators instead of being dissipated to different components, like in standard IC engines. As a result, we can be twice as efficient, retaining double the energy and enabling drivers to travel as much as 1,300 kilometers on a single tank of gas, under ideal conditions. And the cars

will not be more expensive than the ones currently on the market.”

More power and efficiency – and radically lower fuel costs – would no doubt be welcome by consumers. But would the industry – including the hundreds of thousands of garages, the tens of thousands of parts makers, the thousands of dealers, and the hundreds of manufacturers who are all part of the internal combustion ecosystem? And, according to Fridman, just setting up a new production facility for vehicles with slight variations on internal combustion engines could cost between \$1 and \$ 2 billion; how much would it cost to build a new infrastructure for an entire industry?

Many more billions, obviously – but according to Fridman, that will not be an impediment to the adoption of Aquarius engines. “If it were strictly up to industry, there might be some hesitation – but in this case, it is not up to industry, but to government, which has mandated a sharp drop in emissions for vehicles by 2020.”

Those regulations require that manufacturers cut emissions by 20% over already historically low 2015 levels, and they are going to get even tougher in the years beyond. Even in the US, which has trailed Europe on emissions regulations, tougher rules are on the way; the EU’s 2020 regulations will be implemented in the US by 2025, and get tougher from that point on as well .

“It’s true that the car industry has been conservative in the past, but now they have no choice but to change,” said Fridman. “We at Aquarius are ready to help them make that change. We expect to produce a concept car sometime in 2017 with a major European manufacturer, and once that happens, we expect to receive a lot of interest from the industry.”

© 2015 THE TIMES OF ISRAEL, ALL RIGHTS RESERVED