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Revving Up in Rosh Ha'ayin for the Age of Aquarius

Aquarius Engines, based in central Israel, claims to have developed a car engine that doubles the efficiency of conventional engines.

Oren Dori Jan 11, 2016 1:06 AM

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The Aquarius engine. Credit: Courtesy

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There's a common myth that man uses only 10% of his brain. Neurologists have long since shown it to be twaddle, in science at least. But in the car industry, there's something to it. The modern car engine only utilizes 15% to 20% of the fuel it burns up to generate actual power that gets transferred to the wheels. The rest of the energy is frittered away, mainly in the form of heat.

That could change thanks to a startup from Rosh Ha'ayin that has developed a far more economical, efficient engine that, with energy utilization of about 40%, doubles the best produced by today's engines. Until now, energy efficiency of that magnitude had been reserved for race cars on closed tracks, but Aquarius Engines intends its product for everyman's car.

Don't believe it? Car manufacturers were skeptical too. Some took the Israeli product to test in their labs. Now, Aquarius says, a big European carmaker is planning new cars based on the thing and others are getting involved, though at this stage their names are confidential.

The Aquarius engine doesn't run on water, whatever the company's name might imply. Nor did the company employ futuristic technological breakthroughs like cutting-edge fuel cells. Its breakthrough was actually pretty simple.

Regular engines generate rotational motion that is transferred to the wheels. Aquarius' engine is based on longitudinal movement. That's it.

Inside the engine is a single horizontal cylinder of 500 cc in volume, and a piston moving from side to side that generates 86 horsepower. Unusually, the engine doesn't drive the wheels directly. It serves as a generator that charges a battery lying on the floor of the car, beneath the back seat. The battery operates two small electric engines located by the front wheels: these engines are responsible for moving the car.

Aquarius marketing manager Gal Fridman explains the advantages of the revolutionary engine, and shows a prototype, which is a lot smaller than the great heavy blocks one finds beneath car hoods. “This engine contains many fewer mechanical components inside and around it,” Fridman explains. “It has no valves, crankshaft or other associated parts, so a car equipped with it will be much cheaper and more efficient.”



From left: Shaul Yaakoby, Ariel Gorfung and Gal Fridman. Credit: David Bachar

Company has three patents to its credit

The company has already registered three patents, Fridman says.

The vision is of a whole new type of car, built around the unique characteristics of this engine, even as far as design is concerned, he continues. “Because the engine is small and free of gratuitous parts, the dimensions of the car will be utilized better. Cars will look completely different.”

TheMarker: Until that time, can your engine be installed in existing models?

“That isn’t our goal, but yes,” Fridman answers. “In a pilot we’re doing with a European carmaker, our propulsion system is being installed in a common mini model, also sold in Israel. The first tests have gone well, but we don’t have official technical data yet, for instance regarding fuel consumption, or speed performance.”

Box? What box?

The important thing is that the exploitation of the gasoline be very high, which saves the driver money, he says, adding that the European company should be unveiling its new model based on the engine from Rosh Ha'ayin within a couple of years. Fridman adds that the European company will get six months' excluding marketing rights, ahead of other manufacturers, who are also showing interest.

How are the reactions in the car industry to your invention?

“The engine testing company AVL, which is the industry leader, recently confirmed our fuel utilization data and said that after 100 years and hundreds of trillions of dollars invested in engine technology, our starting results are astonishing by any criteria. A lot of inventors try to think outside the box, but according to people who looked at the engine, our inventor, Shaul Yaakoby, has no box at all.”

Is your engine only for small cars?

“Not only, but yes; one can see that the car industry is going in the direction of cheap, economical mini vehicles, and we suit that trend.” The engine is also being looked at by bigger boys too, he says.

In recent years pressure has been mounting — enormously — on carmakers to reduce the emissions of their mobile products. Clearly, going by the scandal engulfing Volkswagen and its emissions scam, constraints on the manufacturers are so onerous, and require technological changes so profound, that even the biggest carmaker in the world resorts to cheating on the test.

Surprisingly, according to research by the giant accounting firm-cum-consultancy KPMG, manufacturers have been scaling down their investments in developing electric cars and technologies based on alternative fuels. The industry chiefs are focusing again on engines driven by gasoline and diesel, writes KPMG.

Why? Because they assume that the giant developing markets, like India and China, will provide a living to makers of the old-tech gasoline engine for many, many years to come.

Fewer than 3% of the 89 million cars made every year are hybrids or electric cars, notes Fridman. That is because hybrid and electricity cars are expensive to make and the range of electric cars remains a serious constraint. Their invention has rendered the big engines and expensive batteries of the electric cars obsolete anyway, he says.

Aquarius was founded in 2014 by Yaakoby, the company's CEO Ariel Gorfung and the marketing VP, Fridman, each of whom comes from a different area and brings different attributes to the mix. Yaakoby is an inventor; Gorfung has experience in setting up startups.

To date Aquarius has raised \$3.5 million.

“When we realized what we had in hand, we decided to abandon everything else and focus on Aquarius,” says Fridman. “I’ve been around in life but never saw doors open as fast as it is happening with us now.” He whips out his phone and shows us a picture of Gorfung standing with the very well-known owner of a major European car company.

Usually things change slowly in the car industry, but in this case, the manufacturers are racing to proceed, says Fridman. “When I say we’re going to change the world, it’s hard to convince people that it’s real. But the car manufacturers already got it.”

Doesn't your engine threaten the car industry? You want to pull the rug out from under their technology and declare it obsolete.

“Not necessarily,” Fridman says. “We’re not really a new technology. There’s no need to build a new battery for us, or to etch special cylinders that cost a fortune. We don’t need to invest much in development.”