Industry writer Steve Kealy meets Ron Kukler, a Melbourne inventor with a passion for injection

A timely squirt

There's nothing small about Ron Kukler's ideas. He's spent $4 million and ten years working on a device he believes will change the world. He'll build you a two-million dollar yacht, complete with a helicopter on the deck; and he says he can cut the fuel consumption and exhaust emissions of almost every engine on the planet. Now.

Put simply, Ron has come up with a small replacement component that he claims could make almost every engine in existence cleaner, leaner, more powerful and more environmentally responsible.

But he's resigned to the fact that it probably won't be made in Australia and is looking overseas in particular to the United States. He's frustrated at the lack of meaningful assistance from the Australian Federal government, using words like "Useless", "Window-dressing" and "Merchant Bankers in disguise."

Ron's device, the Green Diesel Injector, for which he received an Inventor of the Year award last year, is a deceptively simple-looking thing, about the size of a large cigar; it has an electrical plug socket, a fuel inlet and a spray nozzle.

It is a replacement two-stage diesel injector, which pushes fuel into the combustion chamber at a huge pressure, generating a mist of finer, faster-flying droplets than conventional injectors. "In tests on various stationary, automotive and marine engines, it has recorded a 30% increase in power, a 30% reduction in fuel consumption and a massive decrease in exhaust emissions which will see even notoriously "dirty" diesel motors meeting stringent US and European exhaust targets set for 2008.

He insists that existing injector systems deliver far less pressure than they claim and that he can cut manufacturing costs to ten percent of theirs – that's not BY ten percent it's TO ten percent.

And if that weren't enough, Ron's invention also cuts combustion noise and vibration too.

According to Dutch-born Kukler, the Green Diesel injector has multi-fuel applications too – it will work with diesel, ethanol, LPG, petrol – even Jet-fuel, and can make almost all internal combustion engine designs compression-ignition compatible.

Like many brilliant devices, it is deceptively simple – although Ron is obviously not being too specific about details, he says there are no springs and cams inside his injector In the first stage of injection, fuel is squirted into the engine at a pressure of 30,000 pounds per square inch, but in the second stage, the pressure is doubled. It's this high pressure that Ron credits for the improved combustion to which he lays claim.

The injector requires no specialized machining and are factory-sealed, needing no maintenance; unlike a common rail, which may require partial or substantial component replacement, the Green Diesel injector is self-contained. And should any individual injector fail, it can be replaced in minutes – it's even self-bleeding. It is self-energising, using the pressure in the combustion chamber for its power source.

Yet, despite the almost magical improvements which Kukler says his new injector will deliver, he refuses to patent the device, as he says the specific disclosures required to register a design are too easily pried open by unscrupulous lawyers and their clients.

Instead, he's looking for a joint-venture with an ethical company, which will volume-produce the devices.

In the interim, he's set up a company called Green Diesel, and issued an initial Offer Information Statement ahead of selling just four percent of the shares to raise four hundred thousand dollars. These funds will be used to finance a working, certifiable motor & injector assembly, attain accreditation and establish legal agreements. A second rights offer will finance a production facility, an international marketing campaign and promote licensing agreements with foreign manufacturers.

A third rights offer will involve a public listing on a major stock exchange to launch marketing campaigns to OEMs and governments.

Kukler's also talking to the US military – who, in the light of their recent forays into various inhospitable theatres of engagement, suddenly have a new understanding of supply-chain management. As in, if vehicles could double their range, there would be fewer vulnerable transport convoys. And while the wheels of US approval grind awfully slowly, there's not much like a military imperative to spur things along.

So far, an under-secretary for Defence at the Pentagon, in charge of Acquisition, technology and logistics is impressed enough to have circulated details to the Tank and Heavy Equipment Division in Detroit.

The department in General Motors that deals with New Devices is also aware of the invention.

The irony with the interest shown by heavy equipment users is that Ron came up with the design when he was looking for a high-revving lightweight diesel for a marine application. All the available motors were, according to Ron, "Too heavy, too noisy, too expensive, or vibrated too much – and they are all imported." Eventually, he converted a 454 Cu in Chev V8 petrol motor to run on diesel, and used that.

Some conventional diesels were converted to using Ron's injectors – these included various Petter engines, a Kubota and a Don Feng but probably the most remarkable would be a three-cylinder two-stroke Orbital – converted to run on diesel..

The engines amassed 10,000 hours of durability testing – some of the motors needed running repairs, but none of the Green Diesel injectors failed and would probably have run for a further 30,000 hours. Tests were carried out under the aegis of Professor Eric Milkins formerly of the Department of Mechanical Engineering at the University of Melbourne and the author of over 100 technical papers. He is Vice President and Honorary Life Member of the SAE and represents Australasia and New Zealand on the World Council of Automotive Engineers.

According to Ron Kukler, the high injection pressure encourages very efficient combustion – and the pressures are generated inside the injectors – there's no need of external pumps, which raise costs and sap power. The two-stage injection process eliminates much of the vibration usually associated with diesels and permits engines using Green Diesel injectors to be more lightly-built – such as those normally accustomed to burning petrol.

Kukler has said that if he can't find the right backer for his invention, he'd rather bury it in his garden – thereby creating probably the only $4m backyard in Geelong. But at least his home town has recognised his achievements – he'll be on the front cover of this year's Geelong's phone book ●

Is this the key to award winning brilliance for improved diesel efficiency for Ron Kukler?

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