

Water whirl: Aussie's powerful patent

The invention is generating electricity and interest but may now be developed in Europe, writes Andrew Trounson

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IT is the telephone call that every inventor dreads, the news that someone else has beaten you to it.

And for Melbourne barrister Paul Kouris, who has aspired to harness the generating power of water vortices, it seemed 30 years of dreaming, 10 years of work and more than \$350,000 spent on patents and development would all be for nothing.

When Kouris's collaborating engineer David Sattler called him last Monday to say he had stumbled on news that a small power project in Austria was successfully generating hydro-electricity from a turbine driven by a water vortex, Kouris saw his life dream heading down the proverbial plug hole.

Indeed the project in the Austrian town of Obergrafendorf had, ever since November last year, been successfully providing enough electricity to the local grid to power 10 households.

"I rang my patent attorney and I was just beside myself, I was just panicking," says Kouris, 51.

But the good news for Kouris was that his Austrian patent application for Kouris Centri Turbine (KCT) predates that of the Austrian developers by five years, potentially giving him priority over the intellectual property.

The bad news for Australia is that the technology could now well be developed in Europe rather than here. Kouris, who has for years been fighting a losing battle against indifference at home, believes the Austrian project goes a long way to vindicating his ideas.

Certainly the Austrians appear to have shown that vortex force is sufficient to generate electricity and can be practically harnessed. The Austrian project involves small concrete dams or tanks built on the side of a river with a vortex in the middle driving a turbine.

"It proves that the KCT can be a stand-alone unit making electricity when the topography isn't suitable for traditional hydro power," says Kouris.

But the scientific mainstream remains largely sceptical that vortices can be used to extract additional energy from a body of water beyond that of the traditional gravity fall of the water.

According to traditional physics, using a vortex to drive a turbine would simply take away from the energy derived from the fall of the water. Hydro-electric plants are purposely designed to avoid the formation of vortices.

But Kouris's own test results back in 2004 suggested that the combination of a vortex turbine and a traditional gravity-fed water turbine can increase power generation by a staggering 5-25 per cent. The extent to which Kouris's small backyard testing can be scaled up and economically applied

remains far from certain. But the potential power gains are enormous as the world is struggling to find environment-friendly substitutes to burning fossil fuels.

For example, a 10 per cent increase in the output of Australia's largest hydro-electric operation in Tasmania would yield sufficient additional electricity to power almost 200,000 homes. Ironically, Kouris has been given a short shrift by government, academia and business.

While Ballarat University is interested enough to now try to replicate Kouris's results in the laboratory, Kouris is considering bypassing Australia and may seek to collaborate with the Austrians rather than develop the technology here. Indeed, his father's native Greece has shown more interest in the project than Australia.

"The Austrian Government has been supporting this prototype, the Greek Government is interested in speaking to me, but the Australian Government just keeps referring me to government departments," says Kouris.

"The season for harvesting (the idea) should have been Australia's. And the reason it isn't is that there are too many people in this country who are too cynical, too suspicious and who are only interested in providing harvest capital, not seed capital," Kouris says.

The list of institutions, companies and individuals who dismissed Kouris's ideas is long. None of Victoria's three premier universities - Melbourne, Monash or LaTrobe - was interested. Nor were the big hydro-electric players such as Snowy Hydro, Tasmanian Hydro or the alternative energy company Pacific Hydro.

As for our business elite, Kouris says his ideas didn't even get past the personal assistants of the likes of Richard Pratt, Dick Smith, Frank Lowy, Lindsay Fox, Kerry Stokes or Gerry Harvey.

And from the Prime Minister's office down, Kouris has simply been referred to different departments and different funding assistance programs, none of which he found he could qualify for.

It was back in 1975 during the first oil crisis that Kouris, a philosophy student at Monash University, had what inventors call his Eureka moment. He was in the kitchen of his Melbourne share house doing the washing up, still mulling on the arguments he'd had in the cafe that day with science student friends over alternative power sources. Pulling out the plug, the familiar vortex formed as the water drained out of the sink.

"As I was watching it there was this voice in my head saying, 'There is your energy source!'"

But it wasn't until 1996 that he began to seriously pursue the idea, and he was pleasantly surprised to discover he had no serious problems patenting it, first in the US in 1998, and then elsewhere.

But that was only the start of his frustrations as he found that no one was prepared to take on the idea and build a pilot plant or inject money into it.

The idea of using vortices to generate power isn't new and may well be one of the reasons why Kouris couldn't get anyone to listen to his ideas, which seem to go against standard physics.

The law of the conservation of energy states that the total amount of energy in a system is always the same and can't be created or destroyed.

But Kouris asserts that the introduction of a vortex can boost the energy output of a body of water by

tapping into the energy that comes from the spin of the earth, the so-called "Coriolis" force named after French engineer Gaspard Coriolis who first identified it in 1835.

The power potential of the Coriolis force is itself a controversial issue among scientists and typing Coriolis into Google will yield more than 2.5 million hits.

"The view of the physics is very mixed," says energy scientist Harry Schaap, an adviser to the National Generators Forum that represent the country's big power companies.

"It is the general belief that if you introduce a vortex you decrease the kinetic energy flow, so you won't end up being any better off," Schaap says. But, he adds, that doesn't mean Kouris's ideas and test results should be dismissed, and he believes it is worth trying to prove them.

Frustrated by the lack of interest, Kouris was forced in 2004 to try and demonstrate his theories himself using two water tanks, a pipe and turbine on his rural property in Victoria. His ideas had twiggged the interest of Melbourne business advisers William Buck, who introduced Kouris to engineer David Sattler, and the two set about trying to prove the theory with a 4500-litre reservoir.

The final results were more than encouraging, if difficult to explain. They found that the vortex turbine could generate 183 watts without reducing the power being generated from the traditional gravity-powered draining of the water. In fact the vortex appeared to improve the flow rate, raising the gravity -driven power from 1022W to 1112W for a total energy increase of 27 per cent.

But again, Kouris couldn't get anyone interested in funding a larger pilot plant, and both the Royal Society of Victoria and the Australian Institute of Energy declined to publish articles on Sattler's findings.

But last year Kouris finally discovered a willing listener in the form of Ballarat University's head of science and engineering, Professor Steve Hall. With a background in the mining industry, Hall knew that the use of vortices had revolutionised the way minerals could be separated in slurry.

Hall is now looking to replicate Kouris's work in the laboratory in an attempt to independently prove his theories. The results are likely to be in by the end of the year and, if positive, the university would be encouraged to embark on a larger testing plant - probably in co-operation with the City of Ballarat, which is promising support for the technology.

"If we can demonstrate to our own satisfaction that it works, we don't need to know exactly how it works ... often engineering leads the science," Hall says.

"It may be that you can use a small volume of water in a cleverer way."

But in the meantime, Kouris and William Buck are putting together a business case based on retrofitting vortex-driven turbines to holding tanks of reservoirs to generate power as water flows out of the tanks.

If it can be proved and made economic then it holds out the prospect of vortex turbines being fitted to thousands of such reservoirs and producing power for local use. "There is huge potential to do some imbedded energy production here," says Hall.

Kouris and his advisers are looking for an initial investment of \$500,000 and have lined up three private potential investors. But at the end of the day, the future of the technology may lie in Europe, where it is already powering light globes.