What's behind bid to split H2 from O

I'm of a generation who, when confronted with the word "hydrogen", thinks of the Hindenburg, the H-bomb, and chemistry classes at school.

Our attention has been drawn to the H word a couple of times in recent months, so it's time to look beyond the German airship disaster of 1937, the hydrogen bomb detonated by the US in 1954, and school lessons about H2O and electrolysis.

In fact, the latter have renewed relevance. Getting the hydrogen out of water has become fashionable in pursuit of clean fuel for our engines. It's an enterprise that has been slipped into *Tapuae Roa*, the Taranaki economic strategy.

When that was re-launched in April, NZ First loose-cannon Shane Jones announced a $20 million lolly scramble to the province's worthies - including $50,000 for research on hydrogen. Come again? Well, nobody did, so far as I can recall. Publicity focused on $13 million to build a better class of duckboard in Egmont National Park, and $5 million for the Taranaki Cathedral. The hydrogen thing went unremarked.

Until now, when we should be sitting bolt upright, because Winston Peters visited Taranaki this month to top up the home-grown hydrogen research project to nearly a million. What does Peters know that we don't? Agreed, we're the province with knowhow on things petro-chemical, and yes, that's been threatened with emasculation. But hydrogen?

The acting-PM may have been reading the same upbeat articles I've found, ones touting hydrogen as a better bet, because you can fill fuel tanks in a trice and use it to power haulage vehicles over long distances. It comes from water and emits water (sort of).

Elon Musk, the American who convinced most vehicle manufacturers to go with batteries, says the hydrogen path has too many processes and is hopelessly inefficient. He's partly right – using national grid electricity to charge a battery-powered vehicle is 70 percent efficient, compared with around 20 percent if you use that same grid power to make hydrogen to power an electric car's fuel cell.

That's because the power for a car battery comes straight from plug-in points connected to the grid, whereas hydrogen must be made by using grid electricity in an electrolysis process, compressing or liquifying it, and transporting it in tankers to retail outlets (hydrogen stations, as opposed to petrol ones).

But recharging a car via plug-in takes hours, while hydrogen is fast at the selling point – in a few minutes, you fill your vehicle's tank with it to charge a fuel cell that will power your electric motor further than a battery can.

Although the range and charge-time for battery vehicles is improving, they have a long way to go compared to those with hydrogen-powered fuel cells. There are also questions over battery disposal and the future availability of some raw materials needed to make them, especially if the pace gathers even more to change the auto industry from petrol and diesel to electric power.

Back in the hydrogen camp, there are interesting issues with methods used for producing it. Electrolysis of water is inefficient but produces no polluting carbon dioxide, while the predominant methods of producing hydrogen for industry (steam reforming of the methane in natural gas, or gasification of coal - remember the town gas works) use fossil fuels and release carbon dioxide as a by-product.

As a greener alternative, gasification of biomass is another way of producing hydrogen and other gases that can be used to make fuel.

There are other advances, including those by a West Australian company that has developed a process using methane gas and iron ore to produce hydrogen and solid carbon (no carbon dioxide). That takes advantage of the cheap availability of both inputs in that part of the world.

The Taranaki project is looking to develop “zero-emission hydrogen transport fuel” using natural gas as the input. Might it also use ore refined from iron sands off the coast of Taranaki?

To environmentalists, that might be acceptable if the ore comes from the existing iron sand enterprise at Taharoa in western Waikato. But greenies are unlikely to be happy if the proposed offshore mine at Waverley finally goes ahead and its output feeds a home-grown hydrogen industry.

Such speculation – and that’s all it is at this stage – might also extend to an offshore iron sand exploration permit granted for waters off New Plymouth recently, a development that emerged out of the blue. Are we seeing some dots connecting?