

Drive NEW-CAR TEST

A brave new BMW World

BMW goes to water with its latest hydrogen-powered car. **Barry Park** reports.

IT SPITS out almost pure water, but you wouldn't want to bottle it. It's also powered by what could be the fuel of the future, but it won't get you all that far even if you can find someone to sell you some. And up until now, ordinary people could not drive it. Welcome to the Hydrogen 7, BMW's glimpse of a future without oil.

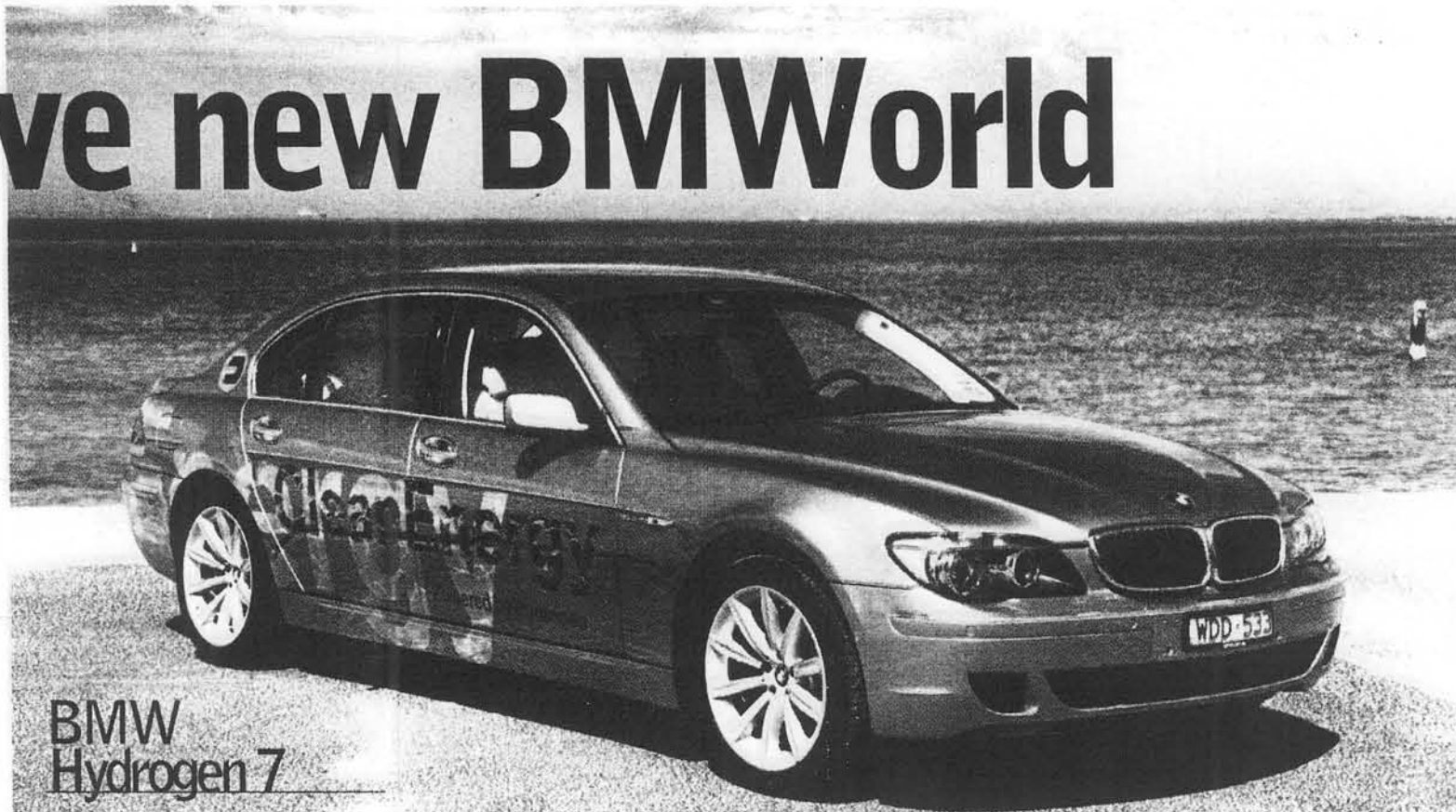
The German car maker this week invited Drive to have a steer of its hydrogen-powered 7-Series saloon, here as part of an international showcase of its hydrogen technology, now about 30 years old and into its sixth generation.

It's a dual-fuel car, as the eight kilograms of hydrogen the vat-sized stainless steel-and-aluminium foil tank in the boot holds is good for only about 200 kilometres. Keeping a petrol tank under the car adds 500 kilometres to its range.

Behind the wheel, the Hydrogen 7 is laid out just like a normal car. There's a "H₂" symbol in the middle of the dash to show we're running on hydrogen, not petrol, and a "H₂" button on the steering wheel to switch the fuel source from hydrogen to petrol. At start-up it's hydrogen by default.

Hit the start button and the engine cranks. And then cranks some more. Like an LPG-fuelled engine, it takes a while for the hydrogen gas, warmed up by the engine's cooling system from minus-253 degrees in its tank down the back to about 30 degrees, to feed into the engine.

The tank is so big that it protrudes slightly into the cabin's rear sill, which takes on an odd hump-backed shape. The 40 layers of aluminium foil sandwiched between an inner and outer skin of stainless steel can hold the liquid hydrogen — at a temperature that is colder than even the surface of the rock in space named Pluto — for a day before it begins to boil off and escape through



BMW Hydrogen 7

safety vents. Store the car for six weeks, and about half the hydrogen in the tank will eventually escape through the vents, even though the tank's insulation is so good that it will keep ice frozen for 13 years.

That's not to say the Hydrogen 7 is unsafe. Researchers have put the tank through myriad tests, including shooting it and setting fire to it, and have even crashed a truck into it. There's a saucer-sized vent in the roof so that the hydrogen can leak out safely if the car crashes, and another one in the floor just in case the car rolls onto its roof.

The 6.0-litre V12 engine is a modified version of the 327 kW petrol-only version. It puts out 191 kW when running on hydrogen, and also adds weight, thanks to its special fuel-delivery system.

On the road, the extra weight and reduced output from the V12 is noticeable. On hydrogen, the V12 puts out about as much power as a high-end Commodore, and spits out about two glasses of water a kilometre.

Still, we're steaming along the road to the water at Elwood beach for a photo shoot. There's only a trace of carbon dioxide escaping with the steam through the exhaust pipes, from the oil used to lubricate the cylinders, and a smidge of nitrous oxide generated by nitrogen found naturally in the air if the accelerator pedal is forced into the carpet.

Push the steering wheel-mounted

button to switch the fuel source to petrol, and the engine — detuned so as to avoid a huge gap between each fuel's performance — produces about 260 kW.

In the cabin, there's no noticeable difference other than a quiet "click" from the boot as the hydrogen tank's valve opens or shuts.

Outside the car, the change from one fuel source to another is much easier to hear. On petrol, the Hydrogen 7 has a nice, deep V12 thrum. Cut across to hydrogen, and

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the engine takes on a dry, raspy, metallic note.

The big V12 chews through the hydrogen at a relatively high rate. Our 30-kilometre drive through suburban traffic uses up about one kilogram of the tank's capacity.

As we pull in beside the container-sized portable refuelling station and its equally large tank of liquid hydrogen — we can tell you with a certain sense of irony that it's sourced and shipped from Beijing, and is the product of refined fossil fuels — we're told that the car's tank needs to be more than one-eighth empty to refuel safely.

But we do get to try the fuel-filler system, which borrows heavily from the formula-one racetrack.

Push a dash-mounted button, and the hydrogen fuel filler cap mounted high on the C-pillar opens electronically. The idea is to now get a heavy fuel filler hose (the thickness of your leg) to attach to a male connector about the same diameter as a normal petrol tank's filler pipe.

It takes a bit of practice, but once you're comfortable that you've got the hose on the right angle, give it a

to fit a hydrogen system. Instead, it's better to build cars around the bulky hydrogen tank, says Willibald Prestl, the project manager of BMW's CleanEnergy project that is developing the hydrogen systems.

The system needs to be scaled down — BMW is working on a four-cylinder engine — but Dr Prestl says that a change to hydrogen will add about 70 kg to the weight of a car compared with today's petrol versions, not make it lighter.

However, one benefit designers will have is the structural strength of the hydrogen tank, which can be incorporated into the structure of a commercial hydrogen car, the first of which we're likely to see about 2025.

And Dr Prestl sees Australia as an ideal country to take advantage of hydrogen technology, surrounded by water, a ready source of hydrogen, and free electricity from sunshine to generate the fuel.

It's early days yet for the team behind the Hydrogen 7. The next generation will add a super or turbo-charger, increasing the engine's power by about a third. The plan is also to increase hydrogen's range to about 500 kilometres — the range of some of BMW's M-badged performance line-up. That's a good association for BMW to make. It suggests our motoring future could be guilt-free. Bring it on.

See the BMW Hydrogen 7 on the road at drive.com.au/video.

decent shove to click it into place, it's easy enough. Squeeze two release bars together and the filler pipe pops off easily.

Filling at the temporary station takes a bit longer than it would at a service station of the future. That's only because the temporary filling system first needs to get its lines cold enough so that liquid, and not gaseous, hydrogen flows into the tank. It's about a six-minute process from start to finish, but estimates are that a dedicated filling station can cut that to about four minutes.

But there's not much point in building big, heavy cars that struggle