Hydrogen didn't work for the Hindenburg, but can the gas be safely supplied to Australian homes?
By Camron Slessor abc.net.au July 10, 2020

Ever since the Hindenburg airship disaster of 1937, hydrogen gas has suffered from an image problem.
The inferno killed 36 people at Lakehurst, New Jersey, and effectively brought to an end the era of the passenger airship, as well as leaving lasting doubts about hydrogen as a source of fuel.
The Hindenburg didn't rely on highly-flammable hydrogen for power, but for lift, because the gas is lighter than air.
Despite that disaster, there have been attempts in recent years to safely harness hydrogen's flammable properties, and develop it into an environmentally-friendly fuel that is piped into Australian homes.

"Our understanding of how to handle things like hydrogen in the 1920s and 30s was very different to what it is now," said Professor Ian Mackinnon, an industrial chemistry expert at the Queensland University of Technology.

"Hydrogen is now able to be managed much more carefully and safely.

"We are now going back to the idea that if we increase the calorific value or the heat value of our natural gas by adding just a little bit of hydrogen, we'll get a bit better efficiency and better performance."
The Federal Government has outlined a national hydrogen roadmap, and there are more than a dozen pilot projects around the country, including in Tasmania and Queensland, considering ways to add hydrogen to the mix of natural gas for domestic use.
Those projects include one in suburban Adelaide, which recently marked a major milestone.

The State Government has announced the installation of what it said was Australia's largest hydrogen electrolyser at the Tonsley technology hub.
The electrolyser will allow hydrogen to be extracted from water using renewable energy, and pumped through the natural gas network into hundreds of homes in the southern suburb of Mitchell Park.

'Hydrogen revolution' predicted
The Tonsley project was announced in 2017, and SA Energy Minister Dan van Holst Pellekaan said it could eventually lead to improved energy affordability for households and businesses.
"This is actually the start, in a hands-on way, of the revolution of bringing hydrogen into our economy," he said.

"This is the foundation of not only strong and safe domestic consumption of hydrogen, but also of an incredibly valuable export opportunity, billions of dollars of value down the track."
Mr van Holst Pellekaan said the 1.25-megawatt electrolyser would reduce the carbon footprint of the state's gas supply by using renewable electricity to extract hydrogen gas from water.
Once operational, he said the $11.4 million demonstration project would be capable of producing up to 480 kilograms of hydrogen per day.
"That will supply more than 700 properties in nearby Mitchell Park with a blend of up to 5 per cent renewable hydrogen delivered through the existing gas network," he said.
Mr van Holst Pellekaan said the Government's intention was to "blend up to 10 per cent renewable hydrogen" into the state's gas mix.

Is hydrogen safe to use?
Hydrogen is highly flammable, with airships switching to the much more stable helium gas after the Hindenburg disaster

But Professor Mackinnon said it was important to point out that natural gas used in homes also carries risks which are managed on a daily basis.
"Not all pipelines can carry high levels of hydrogen," he said.
"[Hydrogen] is a bit more risky, in the sense that there are different burning properties. If hydrogen inflames, it's pretty hard to see it, whereas if you see methane or natural gas burning, you can see black smoke.
"But you would rarely come across that … because the safety conditions for both gases nowadays are pretty strong."

The company behind the project, the Australian Gas Infrastructure Group (AGIG), said the Tonsley electrolyser would prove just how safe hydrogen could be.

"It is safe and it is achievable. What we need to be focused on going forward is increasing those blends into the gas distribution network," AGIG strategy manager Craig de Laine said.
"Our network is hydrogen-ready … the ultimate objective is whole-of-network conversion to hydrogen."
Mr de Laine said the pilot would have no impact on consumers' gas bills, but could lead to gains if further developed.
"There will be no difference to the supply of gas that [consumers] receive or the price that they pay," he said.

Hydrogen has 'enormous potential'
Renewable energy advocate Giles Parkinson said the industry had been looking into the economic value of hydrogen for decades.
"It has enormous potential — they've been talking about the hydrogen economy for the last 30 or 40 or 50 years," he said.
He said there were several reasons why hydrogen had finally "arrived" as a potential energy source.
"One is the low cost of wind and solar, two is the growing need to accelerate reductions in emissions," he said.
While admitting some may still be cautious of using hydrogen as a fuel source, he said the industry had well and truly moved on since the Hindenburg went down.
"Certainly hydrogen for use in airships like the Hindenburg — I don't think anyone is going to be doing that anytime soon," he said.
"We've got a lot of controls over the fuel now and we've got greater-advanced technology."