



Australian Government

Chief Scientist

DR ALAN FINKEL AO

International Conference on Hydrogen Safety 2019

Plenary Speech

Hydrogen safety, at scale

Tuesday 24 September 2019

Adelaide

Before looking to the future, I want to take you back to 1946.

Sir Douglas Mawson, the famous explorer, is here in South Australia serving as a Professor at the University of Adelaide.

In between his professorial duties, Mawson is waging a campaign to establish a permanent Australian presence in Antarctica.

“As proprietors of so large a slice of the south” Mawson declares, “we owe to the world, and for our own benefit...to find a suitable site for a permanent base...[and] carry out scientific work which should be of great value to Australia”.

Mawson’s activism succeeds and in 1948 the Australian Antarctic Division is born.

Just six years later, under the leadership of explorer and scientist Dr Philip Law, the Australian Antarctic Division fulfils Mawson’s vision and establishes the first permanent research base on the Antarctic continent, naming it in his honour.

Dr Law notes that Mawson Station could become “an arena...to demonstrate [Australia’s] scientific and technological excellence”.

“But what does this have to do with hydrogen Alan?” I hear you asking.

Well the incredibly hostile environment in which our Antarctic researchers live and work means a significant amount of fuel is needed to support their endeavours.

In the year 2000, over two million litres of diesel fuel were used to provide power and heating to stations operated by the Australian Antarctic Division – and the purchase, transportation, and storage of such vast amounts of fossil fuel entail significant economic costs and environmental risks.

But what to do?

When I was a child, I read a suspense novel called *Ice Station Zebra* by Alistair MacLean, in which the hero, spy agent Dr Carpenter, is trying to locate and rescue the team of an Antarctic weather-station that had been gutted by fire.

This book forever cemented in my mind the danger associated with using fuel and electricity in Antarctica.

As he is about to embark on his mission, Dr Carpenter laments “with their fuel oil reserves completely destroyed and their food stores all but wiped out, it is feared that those still living cannot long be expected to survive”.

If only they had the enterprising team of the Australian Antarctic Division by their side!

In 2005, using energy from wind turbines, and through the process of electrolysis, the Australian Antarctic Division was able to generate renewable hydrogen in Antarctica and transport it in cylinders using a hydrogen-powered quad bike.

The hydrogen was then used to power the everyday activities of Australia’s Antarctic scientists on Mawson Station – fuelling cooking stoves and generating electricity to run heaters, lights, computers and even a bread-maker.

What a staggering feat of ingenuity – proving that even in the coldest, darkest, most-hostile continent on Earth, where special materials and construction techniques are often required, hydrogen energy can be safely and effectively harnessed for human benefit.

That way of thinking, that spirit of curiosity and innovation and the willingness to challenge boundaries of science and technology: to try, and fail, and then try again, it's all part of the process of discovery.

It's what has spurred countless advances and benefits for our society.

And yet, as the march of technology continues to present greater benefits, it also presents greater hazards than ever before.

Take my day for instance.

In getting ready for today's Conference, I woke up and turned on my kettle to make a cup of tea.

Feeling a headache coming on I took a paracetamol (acetaminophen for our U.S. friends), had a shower, got dressed, walked downstairs, and drove from my hotel to this Convention Centre.

Finally, seeking a quick energy hit before my presentation, I bought a chocolate bar from the vending machine.

On the face of it, a pretty mundane morning.

But the reality is that these simple activities, which are firmly embedded in our everyday lives, all have some degree of risk associated with their use.

Paracetamol is the substance most frequently involved in overdoses in Australia, with 10,000 people hospitalised and more than 20 people dying from paracetamol poisoning every year.

Turning on my kettle and taking the stairs might appear innocuous but faulty appliances account for 60 house fires a week in the U.K., and in 2017, 77 Australians died from falling down the stairs or tripping on a step.

Driving my car was positively reckless with more than three people a day killed on our roads.

And as for my chocolate bar from the vending machine? According to the U.S. Consumer Product Safety Commission, on average two people a year are crushed to death by toppling vending machines.

And yet here I am, alive and well.

As a society, we understand that accidents do, of course, happen, but we rightly expect our standards and codes to mitigate these risks as much as possible.

And here in Australia we proudly have some of the highest safety standards in the world, which has garnered the trust of the Australian people as new technologies and innovations are introduced.

Indeed, a study conducted last year by University of Queensland found that three in every four Australians trust our regulations and standards will enable the development of a safe hydrogen industry.

Our challenge, therefore, is to live up to these standards and community expectations.

Decades of experience and continuing progress in technologies have shown that hydrogen power is reliable and secure.

From ammonia production to petrochemical refineries to metals processing to chemical, food, and glass manufacture, the safety record of hydrogen in this country is exemplary.

I am confident that this record can be maintained as we seek to open new frontiers and expand our energy horizons.

As Chair of the Council of Australian Government's Hydrogen Working Group, I can report that we are currently developing our National Hydrogen Strategy by examining five areas of opportunity:

First – Analysing the benefits, risks, and barriers to using hydrogen as a transport fuel in Australia by 2030.

Second – the interplay between hydrogen production and electricity system operation, and the opportunities for clean hydrogen production and storage to contribute to the resilience of Australia's electricity systems.

Third – Analysing the challenges and issues related to introducing hydrogen into Australia’s gas distribution networks, and examining the actions needed to start blending hydrogen into these networks.

Fourth – exploring opportunities for developing an export market for Australian hydrogen with partner countries.

And finally – investigating opportunities for hydrogen as a chemical feedstock and source of industrial heat

I am, therefore, acutely aware of the unparalleled possibilities this source of power can unleash.

However, I am also aware, and I firmly believe, that its benefits across all areas will only be realised by a wholehearted commitment to safety and transparency, and our ability to bring the Australian community along on the journey.

To maintain the trust of the Australian people, every effort must be made to protect public health and safety and to provide straightforward answers to any legitimate concerns about producing hydrogen at scale.

We must also ensure the process of determining the safety and environmental standards of hydrogen is more extensive and more accessible to the public than for any comparable enterprise.

We must, in short, pay attention to every aspect of hydrogen safety – from down in the weeds, right up to the tree tops – and encourage everyone to get involved in this endeavour.

Indeed, we have already seen how embracing a spirit of partnership across sectors, and enhancing public understanding of hydrogen, can reap benefits.

In the State of California, through a creative collaboration of automotive companies, energy providers, developers, and government agencies, the California Fuel Cell Partnership has established a self-sustaining market for hydrogen fuel cell vehicles, underpinned by a commitment to safety and transparency.

Through exhibits, vehicle demonstrations, and presentations to schools, conferences, and community stakeholders, the Partnership ensured the public understood and felt comfortable with hydrogen technology prior to its introduction.

Crucially, the Partnership also joined forces with the Pacific Northwest National Laboratory to develop and deliver hydrogen safety-related emergency services training materials and programs.

As Hydrogen Safety Program manager at the Pacific Northwest National Laboratory, and now Director of the Center for Hydrogen Safety, Nick Barilo, who is here with us today, noted “part of the training is to remove the stigma. People don’t understand what hydrogen is all about.”

Through more than 10,000 sessions, emergency responders were educated on the safety features built into hydrogen fuel cell vehicles as well as what to expect when they arrive at the scene of a crash.

The fruits of this labour are there for all to see, with Californians owning more hydrogen fuel cell vehicles than any country in the world.

The numerous hydrogen stations along California’s highways offer a glimpse of how a comprehensive, coordinated approach can lead to a large, rapid growth in hydrogen demand.

This success also illustrates one of the most important principles of good safety regulation, little understood by the public but fully understood by experts like yourselves.

The principle is that we *can* have our cake and eat it too.

More specifically, what I mean is that good safety regulation should *simultaneously* ensure the safety of the public and facilitate commerce.

Which is why I am delighted that Australia will be joining the Center for Hydrogen Safety, exploring how our emergency services personnel can leverage the expertise of Nick and his team.

By working together, we will further advance our collective goal of not only maximising safety but also enabling the industry to thrive by doing so.

Indeed, ensuring this goal is realised has been the focus of this Conference since it was first held in 2005.

At that first Conference in Pisa, Italy, members declared their intention “to improve and co-ordinate the knowledge and understanding of hydrogen safety, [and] foster a sound basis for the removal of safety-related barriers to the implementation of hydrogen as an energy carrier”.

The growth of Conference participants over the subsequent years is proof of the success of that objective, as is the global recognition of HySafe as a centre of industry expertise.

In Europe, in particular, your efforts have been instrumental in 25 European Union countries declaring their support for sustainable hydrogen technology, as well as securing EU funding of more than 100 million euros for hydrogen-related projects.

Closer to home, the Government here in South Australia has been an active member of HySafe since 2018.

It is testament to the vision and sustained action of successive South Australian governments, and its public service, that the Festival State is now an established world leader in the transition to a cleaner and more energy efficient future.

Hosting this Conference for the first time ever on our shores underlines this commitment as we nurture hydrogen’s role in a sustainable energy system, and ensure safety underpins all elements in its development.

The findings, information, and data presented by the world’s best hydrogen safety experts over the next three days will be invaluable to the pioneering work that lies ahead of us and I encourage you to reach out to members of our taskforce who are here with us today.

Our nation's capacity to utilise new industries and technologies to overcome our greatest challenges has driven our success as a nation: an Australia that lives and dies by its standards and quality brand.

From Antarctica to the mainland, our nation's story is replete with visionaries who reach for the frontier where exploration and discovery begin, who test the limits of human endurance and technology in their unyielding effort to turn a curiosity into concrete results.

That same spirit can usher in a new national industry that will protect our environment, expand our economy, and create thousands of jobs, in a safe and efficient way. The time to act is now, to seize the moment.

By working together to ensure the highest standards of safety, we can turn the long-held dream of clean hydrogen contributing to our energy needs into a reality, and inspire a new generation of innovators, dreamers, and doers.

This conference is the perfect forum to safely journey along the next chapter in that dream.

May the Force be with you.

Thank you.