# Australian Hydrogen Research Conference 2024

AHRC 2024
Hosted by: AHRN
THE AUSTRALIAN HYDROGEN RESEARCH NETWORK
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RITZ CARLTON PERTH

From 4-6 September over 240 people attended the second Australian Hydrogen Research Conference at the magnificent Ritz-Carlton hotel in Perth, WA. The following is some feedback from the conference which was seen to be a huge success by those who attended.


“What an inspiring conference, learning about the work researchers around Australia are doing. Key highlights for me were the underground hydrogen storage work, and hearing from the intentional speakers about progress in hydrogen around the world.”

“- Excellent showcase of the current state-of-play of hydrogen technologies across Australia and the globe.
- It was important that a spectrum of speakers from students to professors were able to present their research. This also had the effect of delivering specific research problems to broad research objectives to the audience.
- Almost all research was industry focussed, directed towards being relevant and solving immediate and future challenges.”

“Excellent presentations, covering a snapshot of the broad hydrogen research activities across Australia"

"Great to see the depth and breadth of hydrogen research happening nationally and internationally"

"Carefully crafted programme featured an interesting mix of high-level reviews from the guest speakers and detailed research outcomes from the contributing presenters"

“The inclusion of speakers from the US, India, Japan, Korea, and other countries provided a truly global perspective on hydrogen research.”

“The conference impressively covered a wide range of topics, from hydrogen production and storage to end uses. This breadth makes it one of the most relevant (if not the only) hydrogen conferences for researchers.”

“The additional events, such as the interviews with hydrogen fellows and the career advice session during drinks, were particularly enjoyable.”

“There is still a lot of excitement, goodwill, collaboration, and energy in the H2 space but it isn’t translating anywhere near fast enough to make a difference on the scale required.
Nothing anyone does will be perfect, so do something anyway, fail, learn, move forward!”

**Some key takeaways from the conference from our observers from Hamilton Locke are:**

Sangjin Choi (Korea Institute of Energy Research) discussed Korean government’s strategy and evaluation on hydrogen economy, especially highlighting Korea’s national objective of transition from grey hydrogen to clean hydrogen, which includes pursuing clean hydrogen production from Australia. Dr Ashish Lele (CSIR India) discussed India’s development of technologies across the hydrogen value chain and India’s short-term aim of 5 million tonnes per year of green H2 production in 2030-2035. He highlighted the key challenge in India’s hydrogen development, including skill development in prioritised roles such as hydrogen plant technician, process engineer, O&M manager and system integration specialist.

***Domestic developments***
Natasha Penno (Rio Tinto) discussed the first-in-the-world Hydrogen pilot plant that substitutes the natural gas used in alumina calcination with hydrogen retrofitting the Yarwun Alumina Refinery. Koji Kanamaru (Sumitomo Corporation) introduced Sumitomo’s Gladstone green hydrogen project, with

phase 1 local production and consumption at Gladstone from 2025. Liezl Schoeman (CSIRO) discussed various hydrogen material projects at CSIRO, including the Metal Membrane Technology to separate pure hydrogen from ammonia with fuel cell grade purity.

***Hydrogen-natural gas blend***

Paul Medwell (University of Adelaide) discussed the potential for blending hydrogen into gas pipelines, and highlighted hydrogen-gas blending as the low-hanging fruit on the demand side and the catalyst for investment. Shaun Chan (UNSW) introduced the Hydrogen-Diesel Dual-Fuel Direct Injection engine, which achieves 90% hydrogen energy substitution for power generation. Douglas Proud (Future Fuels CRC) discussed blending H2 into existing and retrofitted gas appliances and explained that some gas appliances can be suitable for retrofitting for 100% Hydrogen.

***Green Ammonia***

Prof Douglas MacFarlane (Monash University) highlighted the importance of ammonia, not only as an energy carrier but, more importantly, as the fertiliser that is fundamental to all the food we consume daily. Prof MacFarlane discussed the second generation of ammonia production from green hydrogen and the Haber-Bosch process, and explained the third generation production of ammonia by direct N2 electroreduction, which can be implemented on a smaller (MW), distributed scale.

***Green Steel***

Alfonso Chinnici (University of Adelaide) discussed the H2 utilisation in commercial burners for iron ore pelletisers. Changlong Wang (Monash University) highlighted the co-location of iron ore and on-site hydrogen production potential across Australia, and explained that exporting green steel from Australia to Japan will have the lowest levelised cost, compared to other scenarios (such as shipping pellets, iron ore, iron or H2 and producing steel in Japan). Andrew Feitz (Geoscience Australia) highlighted that salt cavern storage of hydrogen is the major large-scale hydrogen storage method in the world and is much cheaper than tank storage. Australia's geological potential of suitable rock salt overlap with hydrogen projects in Whyalla, Gladstone and Pilbara. It is more cost efficient to build pipeline to have cheaper salt storage than on-site tank storage. Jorrit Gosens (The Australian National University) emphasised that the competitiveness of H2 Direct Reduced Iron production in Australia, compared with that in China, depends on the relative price of Hydrogen. Marcus Haynes (Geoscience Australia) introduced the Green Steel Economic Fairways Mapper, which provides modelling of levelised costs of green steel across Australia. The economic analysis highlighted that the Hydrogen Production Tax Incentive, H2 storage in salt caverns and profits on curtailed energy can together lead to a viable pathway to the competitiveness of Australian green steel.

***Hydrogen use***

Adam Weber (Berkeley Lab) discussed the California Hydrogen Hub, a state-wide initiative which aims to stimulate hydrogen demand and in turn stimulate production by creating a clean hydrogen ecosystem in California by 2030. The initiative ramps production/offtake of clean hydrogen to 200 metric ton per day (MTPD) for power generation, 252 MTPD for transportation (fuel cell electric truck and bus) and 63 MTPD for port usages. Marika Wieliczko (U.S. Department of Energy (DOE)) emphasised the need to prioritising the deployment of hydrogen refuelling stations, especially for medium and heavy duty trucks, in the imminent future of the next few years.

**Presentations from the conference**

Where authors have given permission, copies of the presentations will be made available shortly on the AHRC2024 website to those who registered for the conference.

## Future conferences

We can learn much from the second Australian Hydrogen Research Conference in terms of its organisation, setting of registration fees, venue, and program and this will be discussed with the PCO ARINEX and the directors of the AHRN. A preliminary decision was taken that the next conference should be held at a venue in Melbourne early in 2026.