Hydrogen 2025 and Beyond

A Symposium organized by the SA&NT Division of ATSE and the SA Group of Australian Academy of Science, in collaboration with the University of Adelaide

Facilitators: Dr Rod Hill FTSE and Prof Geoff Fincher AO DSC FTSE FAA

Agenda

When: Thursday 24th July 2025

Time: 1:00 pm to 6:30 pm

Where: In-person meeting at:

The SARDI Auditorium, Entry 2b, Hartley Grove, Urrbrae, Adelaide

(see large red star at D5 on attached map).

Agenda:

1:00-1:25 Arrival of guests

1:25-1:30 **Welcome and Introduction**

Dr Rod Hill FTSE (Chair, SA&NT Division of ATSE)

Session 1 Overview of the Potential for a Hydrogen Economy

Chair: **Prof Michael Goodsite** (PVC Research Operations & Commercialisation, University of Adelaide)

1:30-1:50 **Tony Wood FTSE** (Director, Energy Program, Grattan Institute, Melbourne

"*Australia's hydrogen powered potential*"

1:50-2:05 **Dr Patrick Hartley** (Leader, CSIRO Hydrogen Industry Mission

"Australia's Hydrogen Industry: Progress and Outlook"

2:05-2:20 **Sam Crafter** (CEO, Office of Hydrogen Power South Australia)

"*South Australia's hydrogen powered strategy*"

2:20-2:35 **Coffee/tea break, with scones, jam and cream**

Session 2 An overview of the status of hydrogen R&D

Chair: **Tony Wood FTSE** (Grattan Institute)

2:35-2:50 **Dr Andrew Dicks** (CEO, Australian Hydrogen Research Network Ltd)

"Hydrogen research collaboration in Australia"

2:50-3:05 **Prof Greg Metha** (School of Physics, Chemistry and Earth Sciences, University of Adelaide)

"Direct production of hydrogen from sunlight"

3:05-3:20 **Prof Shizhang Qiao FAA** (Director, Centre for Materials in Energy & Catalysis, University of Adelaide)

"*Electrolytic Seawater Splitting for Green Hydrogen Production*"

3:20-3:35 **Prof Kathryn Amos** (Chair of GeoEnergy, Earth Sciences, University of Adelaide)

"*Underground storage of hydrogen – opportunities and challenges*"

3:35-3:50 **Coffee/tea break, with scones, jam and cream**

Session 3 Opportunities and economics for hydrogen use at scale

Chair: **Susan Jeanes** (Chair HiLT CRC and former Director of ARENA)

3:50-4:05 **Gavin Yeates** (Mining Futurist at Gavin Yeates Consulting, former VP Mine Optimization, BHP)

"Hydrogen as an energy source in mining and heavy industry."

4:05-4:20 **Prof Gus Nathan FTSE** (School of Electrical and Mechanical Engineering, University of Adelaide)

"*The potential role of hydrogen in the emerging markets for 'green' metals*"

4:20-4.35 **Prof Christian Doonan** (School of Physics, Chemistry and Earth Sciences, University of Adelaide)

"*Challenges in Hydrogen Storage and Transport*".

Session 4 Challenges and Timeframes

Chair: **Prof Geoff Fincher AO DSC FTSE FAA** (former Director of the Waite Agricultural Research Institute and Deputy CEO of the Australian Centre for Plant Functional Genomics)

4:35-4:50 **Prof Bronwyn Gillanders FTSE** (Head, School of Biological Sciences, University of Adelaide)

"*Impact of desalination and other industrial processes on the 'reverse estuary' environment of the Upper Spencer Gulf*"

4:50-5:05 **Dr Kate Holland** (Head, Groundwater Management Group in the Water Security Program, CSIRO)

"*Securing water for an emerging Australian Hydrogen Industry"*

5:05-5:20 **Dr Rod Hill FTSE** (Chair, SA&NT Division of ATSE)

"*Materials and environmental footprint of large-scale hydrogen production and storage"*.

Session 5 What can we learn from overseas experience?

Chair: **Sam Crafter** (CEO, Office of Hydrogen Power SA)

5:20-5:35 **Dr Andrew Dicks** (CEO, Australian Hydrogen Research Network)

"*The IEA Hydrogen TCP and International Hydrogen Research*".

5:35-5:50 **Prof Greg Metha** (School of Physics, Chemistry and Earth Sciences, University of Adelaide)

"*Update on Denmark-Australia Partnership on Green Hydrogen Value Chains, and decarbonising shipping*"

Session 6 Panel Q&A

Chair: **The Hon Trish White AM** (Deputy Chair, Playford Memorial Trust, Director Slingsby Taylor, Board member of Cooperative Research Australia)

5:50-6:20 **Speaker Panel and Audience**

6:20-6:30 **Close of formalities**

Dr Rod Hill FTSE (Chair, SA&NT Division of ATSE)

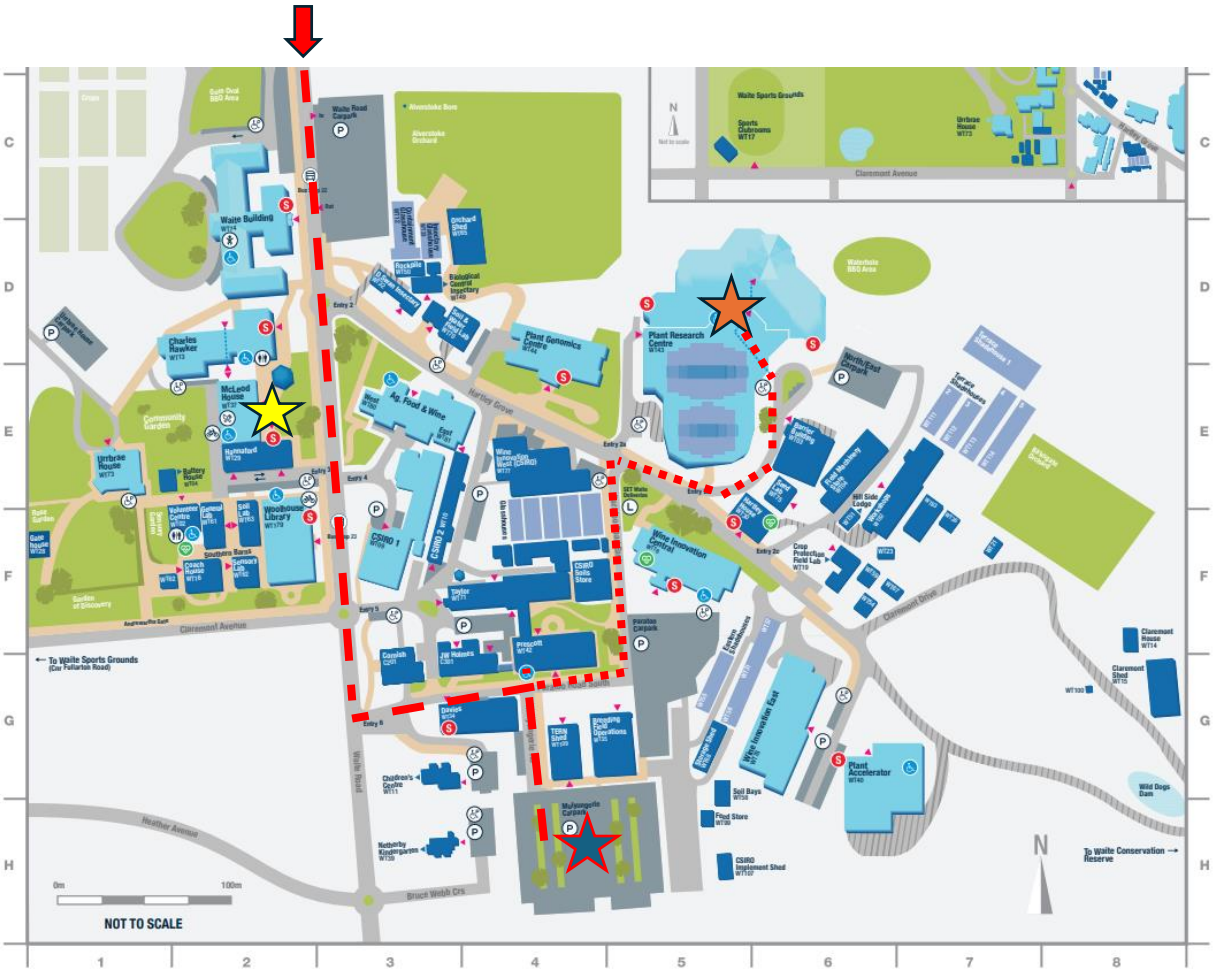
6:30-7:30 **Informal discussion (at the Beltana Café)**

Drinks and canapes served at the Beltana Café,

McLeod House G, Waite Road, Entry 3, Urrbrae.

See yellow star at E2 on attached map.

Directions to the SARDI Auditorium and Beltana Café



For the Symposium:

SARDI Auditorium entrance at ★ at coordinate D,5 9

Parking at ★ at coordinate H,4 8

By car, requiring a parking space:

Turn south into Waite Road from Cross Roads at ↓ at the top of the map.

Follow the dashed path – – south past the 2nd roundabout on Waite Road and turn east (left) via Entry 6 onto Paratoo South Road to Mulyungerie Road (2nd on right) and turn right. The carpark is at the end of Mulyungerie Road.

By foot from the carpark to the SARDI Auditorium:

Follow the dotted red path ····· along the internal roads to the red star (approx. 600m). This is an essentially flat walk with signs in place to direct registrants to the Auditorium.

Those arriving by taxi can turn east from Waite Road onto Hartley Grove (Entry 2), go up the hill and then turn left at Entry 2b at the rear of the Plant Research Centre.

For refreshments at the conclusion of the Symposium:

Beltana Café for post meeting refreshments at ☆ at coordinate E,2 6

Follow the red dashed line back to Hartley Grove and then east (right), down the hill, to Waite Road and turn south (left) on Waite Road to the Café.

Speakers:

Tony Wood FTSE (Director, Energy Program, Grattan Institute)

Tony has worked in the energy, transport, chemical and fertiliser industries. He contributed to the Garnaut Climate Change Review in 2008 and worked with the Clinton Foundation from 2009 to 2014 as director of its Clean Energy programme. At the Grattan Institute since mid-2011, he has represented it in publications, on radio and at public forum. He was on the executive board of the Committee for Melbourne and the Green Energy Taskforce of the Government of the Northern Territory. He has also worked as a financial advisor for PwC and has served as Chairperson of the Energy Retailers Association of Australia.

His areas of interest include natural gas, carbon capture and storage, solar power and nuclear power.

Sam Crafter (CEO, Office of Hydrogen Power SA)

The Office of Hydrogen Power SA has been established to procure, build and operate the Hydrogen power generation and associated hydrogen production and storage facilities that the South Australian Government has committed to have operating by 2025.

Sam has had an extensive career in project implementation, commercial advisory, public affairs and reputation management in both the public and private sector, with a focus on the energy and resources industries.

"South Australia's Hydrogen Strategy"

Dr Kate Holland (Head, Groundwater Management Group in the Water Security Program, CSIRO)

Kate Holland leads the Groundwater Management Group in the Water Security Program at CSIRO. In this role, she leads a group of 40 multi-disciplinary groundwater scientists who work to develop innovative field, laboratory and modelling science to support safe and secure groundwater resources for communities, industries and the environment across Australia, South Asia and the Pacific.

She also leads multi-disciplinary project teams (geology, hydrogeology, hydrology, water quality, ecology and impact analysis) that compile independent, evidence-based information to support policy-makers, communities, industry and regulators to make decisions about future energy and mineral resource development.

"*Securing water for an emerging Australian Hydrogen Industry*"

Professor Kathryn Amos (Chair in GeoEnergy, School of Physics, Chemistry and Earth Sciences, UofA)

Research leadership in the past four years has focused on projects that will improve understanding of and site selection for the geological storage of CO2 and hydrogen, securing a total of over $13 million AUD from industry and government, funding new analytical and experimental equipment, staff positions, and projects.

"Subsurface storage of hydrogen"

Dr Andrew Dicks (CEO, Australian Hydrogen Research Network Ltd)

Started in the UK gas industry, working on everything from coal gasification to strategic economic planning. In the later years, he led a large R&D program on fuel cell systems, collaborating with developers in Europe and North America. More recently, as a senior academic he has led several high-profile research projects in hydrogen and fuel cell technologies involving multiple partners in several countries.

"Hydrogen research collaboration in Australia"

Prof Bronwyn Gillanders FTSE (Head of the School of Biological Sciences, UofA)

Her research group focuses on aquatic waters (freshwater, estuarine and marine) with a strong focus on fish and cephalopods, and environmental issues. The group is part of the Southern Seas Ecology Laboratories in the School of Biological Sciences and the Environment Institute.

"Impact of desalination and other industrial processes on the "reverse estuary" environment of the Upper Spencer Gulf"

Dr Patrick Hartley (Leader, CSIRO's Hydrogen Industry Mission).

He is responsible for the strategic and operational leadership of a major new national research initiative which was launched in May 2021, focussed on delivering research, development and demonstrations which enable the scaleup of Australia's domestic and export hydrogen industries.

In 2018, he established CSIRO's Hydrogen Energy Systems Future Science Platform, focussing on addressing research challenges which underpin the development of hydrogen energy value chains in Australia. During this time, he co-led the formulation of CSIRO's 'National Hydrogen Roadmap, and, with the Chief Scientist of Australia, the briefing paper 'Hydrogen for Australia's Future'.

"CSIRO's 'National Hydrogen Roadmap"

Gavin Yeats (Gavin Yeats Consulting P/L and former VP of Mine Optimisation, BHP)

Mining industry executive and leader in strategy and technology, with a track record of delivering and implementing strategy to deliver profound change to organisations.

"Hydrogen as an energy source in mining"

Prof Gus Nathan FTSE (School of Electrical and Mechanical Engineering, UofA)

Founding director of the UofA's Centre for Energy Technology, Research Director of, the $215m Heavy Industry, Low-carbon Transition (HiLT) CRC, Node Leader in Added Value program addressing solar fuels in the $82m Australian Solar Thermal Research Initiative and led the $14m ARENA funded program in partnership with Alcoa and Hatch to develop technology that targeted 45% reduction in CO2 emissions from the Bayer Alumina process with solar thermal hybrids. He is also a founding chair of the High Temperature Minerals Processing, HiTeMP Forum, and co-founder of Hydrogen Production Technologies, HyPT, Forum.

Prof Christian Doonan (School of Physics, Chemistry and Earth Sciences, UofA)

Christian's research is focused on the development of new porous materials for application to biotechnology, gas storage and separation and catalysis. He has been

involved in over 20 large scale multidisciplinary projects which have received in excess of $42M in funding from research and industry bodies including DSTO, the ARC, US Department of Energy. He has led projects with PETRONAS global valued at ca. $3M AUD, with a specific emphasis on hydrogen storage, CO2 capture, and CO2 utilization

He is currently an SA Government Future Making Industry Fellow at the Institute for Sustainability, Energy and Resources, and Research Director of the Scaling Green Hydrogen CRC bid which aims to become the largest single initiative in the country focused on supporting the vital scaling up of the emerging Australian green hydrogen sector.

"Technical and economic challenges for the export of hydrogen as ammonia"

Prof Greg Metha (School of Physics, Chemistry and Earth Sciences, UofA)

Professor of Chemistry and Acting Director of the Centre for Energy Technology (CET) at the Uof A, Greg established and convenes the international Hydrogen Production Technology (HyPT) series of forums running since 2019. He is also the Australian Director of the NSF-CSIRO Global Center for Hydrogen Production, a sub-task leader for the IEA Hydrogen Technology Collaboration Programme (TCP) Task 45: Renewable Hydrogen Technology, and Australian lead for the Mission Innovation Sunlight-to-X Innovation Platform.

His research uses light sources from lasers to synchrotrons, across the entire electromagnetic spectrum, investigating a range of molecular phenomena to discover new molecules and explore their properties. His most recent work involves using light to produce chemical fuels directly from sunlight such as hydrogen from water-splitting, and hydrocarbons from CO2 reduction.

"Direct production of hydrogen from sunlight"

Prof Shizhang Qiao FAA (Dir. Centre for Materials in Energy & Catalysis, UofA)

Prof Qiao is the founding Director of Centre for Materials in Energy and Catalysis (CMEC) at the University of Adelaide. His research expertise is in nanostructured materials for new energy technologies (electrocatalysis, photocatalysis, batteries, fuel cell). He has co-authored more than 520 papers in refereed journals, including Nature, Nature Energy, Nature Chemistry, Nature Materials, Nature Catalysis, Nature Communications, Science Advances, Angew Chem Int Ed, J. Am. Chem. Soc, Advanced Materials. He has filed seven patents on novel nanomaterials and attracted more than 35 million dollars in research grants from industrial partners and Australian Research Council (ARC).

"Electrolytic production of hydrogen"

Susan Jeanes (Chair, HiLT CRC)

Susan has worked in the Australian renewable energy and broader sectors for more than two decades. She is a Director of Jeanes Holland and Associates (JHA) and a former Director of ARENA. She works with industry, research organisations and governments to build relationships and foster collaboration on shared goals. She has previously held the roles of inaugural CEO of the Australian Geothermal Energy Association (AGEA), and of the Renewable Energy Generators of Australia (REGA). Prior to 2002, she was the Climate Change and Energy Advisor to former Federal Environment Minister Robert Hill and the Member for Kingston in the Federal Parliament.

Dr The Hon Trish White AM (Dep Chair, Playford Memorial Trust, Dir Slingsby Tayor, Board member of Cooperative Research Australia)

Trish White was a senior executive with WorleyParsons, then took up interim CEO roles for technology and manufacturing companies through her company, Slingsby Taylor. Her earlier engineering career involved leading national infrastructure projects, as well as in defence at the Defence Science and Technology Organisation.

After moving to Adelaide in 1990, she became an MP in 1994 and subsequently a Minister in the SA Government. Her portfolios included Transport, Urban Development & Planning, Education, and Science & Information Economy. After 15 years in this role, she returned to private industry, where she has a portfolio of non-executive board roles and consultancies in the transport and logistics, manufacturing, energy and space sectors.

In 2019, she was awarded a Doctor of the University of Adelaide (*hc*) and was made a Fellow of the University of South Australia. In 2021, she was made a Member of the Order of Australia for "significant service to engineering and to the people and parliament of South Australia".

Prof Michael Goodsite (PVC, Research Operations and Commercialisation, UofA and Managing Director of UoA's equity holding company)

Professor Goodsite has served in a number of leadership roles since his arrival at the UofA in 2018, including Head of two Schools (CEME and then ASP), Directing two University Research Institutes (IMER and ISER), and now on his second Pro Vice-Chancellor role (PVC EF now PVC ROC). He created, and was chair of the Faculty's In Situ Resource Utilisation (ISRU) initiative, which evolved into the Andy Thomas Centre for Space Resources, and was the inaugural Director of Commercialisation for the Faculty of ECMS, authoring its commercialisation framework, starting its 'Launchpad'. He was bid sponsor of the successful HiLT CRC and has held leadership roles at two Danish Universities. He has been a member of the Board of the SA Hydrogen Hub, and was the first professor elected to the Council of SACOME.

He is a former US military and NATO officer, and was one of the first Directors of the US Army Cyber Counterintelligence Activity. He Co-Directed the NATO Advanced

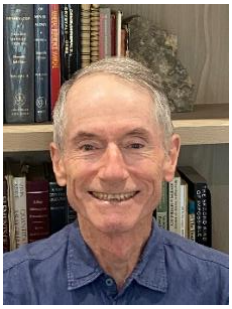
Research Workshop on Green Defence Technology: Triple Net Zero Energy, Water and Waste Models and Applications.

He is a member of the corps of AusIMM trusted voice ambassadors and is appointed by the Minister to the SA Health Human Research Ethics Committee.

Prof Geoff Fincher AO DSC FTSE FAA (Director of the ARC Centre of Excellence in Plant Cell Walls)

Geoffrey Fincher is a cereal chemist renowned for his work on the structure, biosynthesis and digestion of plant cell walls. Among his discoveries were numerous enzymes involved in the synthesis and degradation of cell wall polysaccharides of barley. Between 2003 and 2010 he was Director of the Waite Agricultural Research Institute and Deputy CEO of the Australian Centre for Plant Functional Genomics.

Dr Rod Hill DSc, FTSE, FRACI, FMSA (Chair SA&NT Division of ATSE)



Rod Hill is a retired Chief Research Scientist and Group Executive for Exploration, Mining, Mineral Processing and Manufacturing at the CSIRO and a former Pro Vice Chancellor for Industry Engagement and Commercialisation at Monash University. He has PhD and DSc degrees from the University of Adelaide, South Australia in crystallography, crystal chemistry and mineralogy. He has published widely in the primary areas of energy storage materials, crystal structure systematics and chemical bonding in silicate minerals, and more recently on X-ray and neutron diffraction data collection and structure refinement. The mineral "Hillite" was named after him in 2003.

"*Materials and environmental footprint of large-scale hydrogen production and storage*".