



## Australia-European Union Green Hydrogen Dialogue #3: Summary Paper

### Challenges in the development of green hydrogen supply chains

The third Dialogue in the series of five featured presentations from key EU and Australian participants, who emphasised the need for greater co-ordination of green hydrogen and its derivatives across value chains. Participants discussed their experiences and shared lessons from the perspective of renewable energy production and manufacturing in the context of scaling up the green hydrogen economy, highlighting lessons from project developments and the challenges in developing global supply chains.

The discussions focused on the topics of:

1. Australia's renewable energy potential and potential to generate green hydrogen and derivatives
2. Challenges in developing new value chains, focusing on international trade
3. Technological impact on value chain development
4. Opportunities for developing shipping value chains with the EU

The online Dialogue with a small group of expert participants from Australia and the EU, commenced with short presentations on the Australian and European Union policy and industry context as a lead-in to wider discussion of the key issues. Presentations on the EU and Australian context were provided by:

- Dr Sven Teske Research Principal, Institute for Sustainable Futures
- Martijn Coopman Program Manager, International Hydrogen Supply Chains, Port of Rotterdam
- Arthur Daemers, EU Policy Manager, Renewable Hydrogen Coalition
- Mox Murugan, Business Development Director for Hydrogen, Nordion Energi
- Dr. Amy Philbrook, Australasia Hydrogen Technical Lead, ARUP
- Jorge Garcia Martinez, Green Hydrogen Business Development, Iberdrola Australia
- Kiran Ranbir, Manager – Hydrogen and Clean Fuels Development, ATCO.

The session was facilitated by Liz Boylan, Partner, Energy and Climate Deloitte.

This summary paper provides an overview of the key discussion outcomes, and participant organisations for dissemination through project partner channels.





## Discussion Topics

### Australia's renewable energy potential

Australia boasts significant renewable energy potential, particularly in solar and wind power. Moreover, the country's vast landmass and high solar radiation make it an ideal location for large-scale solar projects. Additionally, Australia's onshore wind potential is estimated at 2000 GW, with particularly strong prospects in the southern regions (from Brisbane downward), with wind energy potentially serving as a baseload power source in some areas.

Acknowledging this potential, the Port of Rotterdam (as well as other EU entities) recognise Australia as one of the top ten countries with significant renewable hydrogen production potential. For instance, Western Australia's Midwest coast, particularly the Oakajee region, shows a promising overlap of solar and wind resources, making it a prime location for green ammonia production at a lower cost than all other locations considered by the Port of Rotterdam.

### Challenges in developing new value chains

Dialogue participants discussed the challenges arising from community acceptance and grid infrastructure limitations in Australia, which present barriers for large-scale renewable project development. It was noted that the acceptance for wind energy in Australia is not as high as in Europe with Australia only recently embarking on offshore wind developments.

Secondly, the majority of Australia's renewable energy potential is in regions far from the coast and accessible water, therefore requiring renewable electricity to be transmitted to regions with ports for export, and necessitating development of major transmission infrastructure. Development of transmission lines however presents considerable challenges, which include land accessibility issues as well as the high costs given the large distances involved. Addressing these challenges was crucial to fully realising Australia's renewable energy potential and transitioning to a green hydrogen economy.

The development of dedicated renewable energy assets and robust infrastructure was highlighted as key to overcoming these obstacles and capitalising on Australia's substantial renewable resources. Supply chain challenges also extend to post-hydrogen and derivative production and related shipping. It was suggested that initiatives such as the green corridor agreement with Singapore are crucial for establishing efficient supply chains.

Water was an oft neglected resource in planning hydrogen projects, both as a feedstock for electrolysis as well as for use in hydrogen plants, raising issues as to water quality and the availability of water sources such as seawater, groundwater and wastewater. A further issue in the development of supply chains that has implications from a social licence perspective, was that wind power infrastructure was increasing in scale with ever bigger turbines being developed.





An example of a regional and integrated approach to system and infrastructure planning across the supply chain was by the Hunter Hydrogen Taskforce, involving all those with critical inputs including utilities for water and electricity, project proponents, industry, ports, and research, to co-ordinate and advise government and the private sector on shared infrastructure requirements for hydrogen production scaling and export. Similarly, the Port of Rotterdam, as a shareholder in port facilities has been able to catalyse the development of the supply chain to Europe for a major export hub in Brazil.

Incentivising demand from off-takers for green hydrogen and derivatives is critical for unlocking the supply chain. An example of the green steel industry was provided, where the development of green iron (as hot briquetted iron (HBI)) is being seen as a promising method for nations with large iron ore reserves and renewable energy potential to export this renewable energy in the form of value-added products. However, one of the challenges associated with the development of such a supply chain is not the green premium associated with these products, but instead the fact that as this market develops, only a few suppliers will be able to provide HBI. Steelmakers would be apprehensive to rely only on one or two key suppliers of HBI, as this opens them up to commercial risk, preferring to import raw materials and produce value-added products themselves.

### **Innovation impact on value chain development**

The future of hydrogen exports from Australia hinges on technological innovation and strategic infrastructure development. Developing necessary infrastructure, such as new ports, remains challenging. Innovative solutions like floating ammonia terminals are being considered to overcome these logistical hurdles. However, there is a risk that current infrastructure investments, such as those for ammonia or methanol, may become obsolete with new technologies (e.g., advanced hydrogen storage). This highlights the need for value chains to be technology-agnostic, welcoming new technologies and innovations to optimise the hydrogen value chain as they emerge.

### **Opportunities for developing value chains with the EU**

The EU is considered at the forefront of green hydrogen regulation, encouraging trading nations to adopt similar regulations and protocols to ensure their products meet the same "green" standards when imported into the EU market. The EU market currently presents huge opportunities for renewable energy supply chain development, especially for nations looking to capitalise on these opportunities. The EU is not only considering energy imports from nations that can provide reliable energy but also from those with similar democratic values. This presents huge opportunities for nations such as Australia to develop new trade relationships with the EU, as they seek to do more business with nations which hold similar democratic values.





## Key discussion outcomes

1. Australia possesses significant renewable energy potential, particularly in solar and wind power, making it ideal for large-scale green hydrogen projects.
2. Despite high potential, challenges such as community acceptance and limited grid infrastructure (and in some cases, limited port infrastructure) hinder scaling up hydrogen production and exports in Australia.
3. Encouraging both production and demand for green hydrogen and its derivatives is crucial to developing these value chains. Challenges in the green steel industry highlight the importance of diversifying suppliers and mitigating commercial risks.
4. The future of hydrogen export hinges on technological innovation and strategic infrastructure development. Investments in infrastructure must be adaptable to accommodate emerging technologies to optimise the hydrogen value chain.
5. The EU's leadership in green hydrogen regulation presents significant opportunities for trade, particularly for nations like Australia. The EU seeks to do business with nations sharing similar democratic values, providing avenues for developing new trade relationships and renewable energy supply chains.





## Moderator

**Liz Boylan**

**Partner, Energy and Climate**

**Deloitte**



Liz is a Partner within Deloitte's energy and climate advisory team and is experienced in advising on long term energy policy and investment decisions, informed by price curves via Deloitte's Bioenergy, Hydrogen and Energy Market Models. She has led numerous hydrogen projects for public and private clients in Australia and has worked in the Federal Government on climate and energy law and policy before joining Deloitte over 5 years ago.

## Presenters

**Dr Sven Teske**

**Research Principal**

**Institute for Sustainable Futures, UTS**



Dr Sven Teske is a Research Principal at the Institute for Sustainable Futures, with over two decades experience in the technical analysis of renewable energy systems and market integration concepts. Since 2015, Sven has worked on research projects for decentralised renewables, storage concepts for high renewable penetration in Australian power grids (ACOLA), development of high renewable energy pathways for G20 countries for an IEA/IRENA project and the REN21 "Global Futures Report" a global survey on energy sector developments. Dr Teske was the Renewable Energy Director at Greenpeace International for 10 years. Sven was a lead author for the IPCC Special Report Renewables (Chapter 10: Scenario analysis) and has been a member of expert review committees and advisory panels such as for the IEA World Energy Outlook Japanese Renewable and the Japan Energy Foundation.





**Martijn Coopman**  
Program Manager, International Hydrogen Supply Chains,  
Port of Rotterdam



Martijn has more than 25 years of experience in the development and management of ports and offshore terminals. With a mechanical engineering background, he has gained experience in all facets of ports, including operations, shipping and development including design, financing, partnering, environmental procedures and stakeholder management. Martijn established a new regional Business Unit for a Dutch port consultant in South East Asia to become regional market leader within 10 years. He has led large scale port infrastructure projects from feasibility stage up to FID in Myanmar (the new deep seaport in the country) and Rotterdam (Carbon Capture and Storage project Porthos). His latest role is as Program Manager International Hydrogen Supply chains at the Port of Rotterdam, focusing on accelerating development of imports of hydrogen to the future major hydrogen hub of Europe.

**Arthur Daemers**  
EU Policy Manager  
Renewable Hydrogen Coalition



Arthur Daemers is EU Policy Manager with the Renewable Hydrogen Coalition (SolarEurope and Wind Europe) responsible for the Coalition's advocacy towards EU policymakers on all files including financing, industrial strategy and infrastructure topics. His previous roles included as Policy Advisor on renewable hydrogen at SolarPower Europe and as a consultant at Eurodom for the agricultural, fishery and industrial sectors of the EU's Outermost Regions (ORs).

**Mox Murugan**  
Business Development Director, Hydrogen  
Nordion Energi



Mox Murugan has since 2022 been the Business Development Director for Hydrogen at Nordion Energi, Sweden's gas transmission system operator. Nordion is currently developing large underground and subsea hydrogen pipeline infrastructure across Sweden and the Baltic Sea to connect producers and off-takers. Mox's former roles include COO at Invest in Norrbotten where he worked with investments in Northern Sweden with a focus on the region's natural resources, in particular green hydrogen. He has extensive experience in environmental issues and investments in renewable and sustainable growth for communities. Mox holds a Bachelor of Laws (LLB) and Arts from the University of Sydney.





**Dr. Amy Philbrook**  
**Australasia Hydrogen Technical Lead**  
**ARUP**



As the Australasia Hydrogen Technical Leader, Dr. Amy Philbrook leads projects related to the development and implementation of hydrogen solutions in the rail, aviation, water, and maritime sectors. Her previous roles include Head of Strategy for Clean Fuels at ATCO, where she led the development of projects for clean fuels, including hydrogen, carbon capture, and biogas. Prior to that, as the Hydrogen and Bioenergy Technical Lead at the Australian Renewable Energy Agency (ARENA), she led the organisation’s hydrogen research and development round, developed and managed its entire bioenergy portfolio, and led the energy from waste Business Research and Innovation Initiative (BRII). During her six-year tenure at the Australian National University, Amy managed the CSIRO Flagship Biofuels Cluster project, mentored and supervised graduate students, and led research and proposal development activities.

**Jorge Garcia Martinez**  
**Green Hydrogen Business Development**  
**Iberdrola Australia**



Jorge Garcia Martinez is an Industrial Engineer from the Polytechnic University of Valencia. He holds a Master in Environment, Sustainability and SDG from the University of the Basque Country, achieved through a scholarship from Iberdrola. Jorge has dedicated most of his career to the Green Hydrogen sector, commencing over three years ago with Iberdrola's Global Hydrogen team in Madrid, focusing on business strategy, opportunities, projects, subsidies, and markets, particularly in Spain and Australia. In September 2023, Jorge relocated to Sydney, joining Iberdrola Australia's Green Hydrogen team as a Business Development Analyst to further develop the company's hydrogen initiatives and decarbonised energy solutions, especially in “hard to abate” sectors.

**Kiran Ranbir**  
**Manager – Hydrogen and Clean Fuels Development**  
**ATCO**



Kiran Ranbir is the Manager - Hydrogen and Clean Fuel Development and has worked across ATCO’s gas distribution, power, and renewables business areas. Her knowledge of the energy landscape has been built from leading and shaping ATCO’s response to government policy over the last four years. Prior to working for ATCO, Kiran was a consultant for a leading consultancy firm and worked in project and policy development roles within the Victorian and Western Australian governments. Kiran has a Bachelor of Economics and Post graduate Diploma of Business.





## Dialogue Participant Organisations

AECOM
Ark Energy
ARUP
ATCO
Bechtel Australia
Carbon280
Climate-KIC Australia
Committee for the Hunter
Department of Climate Change, Energy, Environment and Water (DCEEW)
Department of Foreign Affairs and Trade (DFAT)
Deloitte
Endua
European Union Delegation to Australia
Ferron Energy
Gladstone Regional Council
Iberdrola Australia
Institute for Sustainability, Energy and Resources, University of Adelaide
Institute for Sustainable Futures, UTS
Low Emissions Technology Australia (LETA)
Ministry of Economics, Labor and Ports, Bremen
NewH2 Cluster
Nordion Energi
NSW Decarbonisation Innovation Hub
Orica
Port of Newcastle
Port of Rotterdam
Renewables, Climate and Future Industries, Department of State Growth, Tasmania
Renewable Hydrogen Coalition







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