H2 TECH SERIES

Powered by bp

EXECUTIVE SUMMARY

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The H2 Tech Series powered by bp accompanying the World Hydrogen Summit saw representatives from companies and organisations along the hydrogen value chain share insights on their firms' plans and ambitions and on the industry as a whole. This executive summary provides an overivew of the key sessions across different thematic areas: hydrogen production plans, offtake, political ambitions, electrolysers and fuel cells, mobility, transport and storage as well as innovative technology.

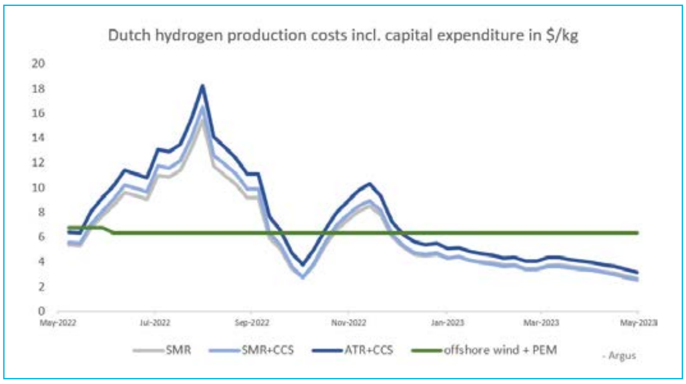
HYDROGEN PRODUCTION PLANS

The **H2 Tech Series powered by bp** was opened by **Karen de Lathouder**, CEO, **bp Netherlands**, who stressed the important role that the Netherlands will have to play in the energy transition, given its status as a hub for heavy industry and its crucial port locations. bp has set itself a target of achieving 10pc market share in future core hydrogen markets "and the Netherlands is one of them," de Lathouder said. The firm has upped its energy transition plans recently, increasing its target for scope 1 and 2 emissions reductions by 2030 to 50pc from an initial goal of 20pc set in 2020, she said. Moreover, bp's targets for investments in "non oil and gas" have been increased to $7-9bn from $5bn. The company's approach to the Netherlands specifically is to treat it as an "integrated energy hub" that connects all of the firm's activities, de Lathouder pointed out. Green and blue hydrogen are to be used initially to decarbonise bp's refinery operations but will also be delivered to other companies, for instance in the transport sector, she added.

French firm **Lhyfe** also has plans for hydrogen production in the Netherlands, among other locations. The company is eyeing renewable hydrogen production sites across Northwest Europe, including the Dutch 200MW Delfzhyl plant, said **Bas van den Beemt**, Country Manager for Sales in the Netherlands .

In addition, Lhyfe sees itself as a pioneer in exploring the possibilities of using offshore electrolysers, having launched a "world first" trial of a 1MW site in France last year.

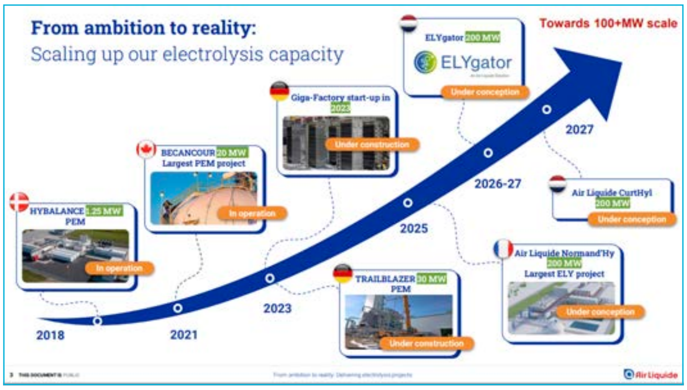
The firm aims to have electrolysers with a combined capacity of 12 MW on line this year, with longer-term goals of 200MW by 2026 and 3GW by 2030, van den Beemt said. Offtakers for the firm's output include retailer Lidl, which uses Lhyfe's hydrogen in forklifts, and German railway operator Deutsche Bahn, he noted.



"bp believes hydrogen is critical. Critical to reach the goals we set under the Paris agreement."

Karen de Lathouder
CEO, bp Netherlands

Marie Khuny Khy, Electrolysis Product Line Director at Air Liquide, shed light on the industrial gas firm's plans in hydrogen production as well as electrolyser manufacturing. The firm is already operating some small-scale renewable hydrogen projects, including a 20MW electrolyser at Becancour in Canada which was the largest in the world when it was commissioned in 2021. The company is looking to move to the 100MW+ scale in the coming years, with several 200MW projects scheduled to come on line from 2025 onwards. On the electrolyser manufacturing front, Air Liquide has teamed up with Siemens Energy and the companies are currently setting up a factory near Berlin that is slated to be commissioned in late 2023. The factory is to reach an output capacity of 1GW/yr of proton exchange membrane (PEM) electrolysers this year which could be ramped up to 3GW/yr by 2025, Khy said.



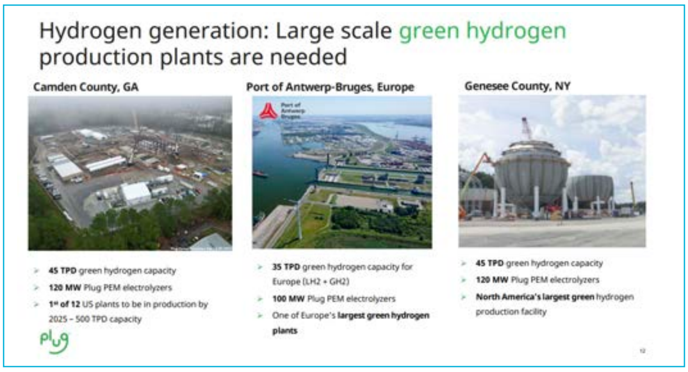
U.S. firm Plug is another company that is pursuing ambitions for both electrolyser manufacturing and renewable hydrogen production sites, as Devon Hyver, its Director for Sales and Market Development, pointed out. The firm's factory in Rochester, U.S., has capacity to produce more than 2GW of electrolysers annually, as well as 60,000 fuel cell stacks, over 7mn membrane electrode assemblies and over 2mn bipolar plates, Hyver said. Plug had said earlier this year that it had produced 122 of its 1MW proton exchange membrane (PEM) electrolyser stacks in the first quarter, marking a new record. In terms of Plug's own production sites, Hyver highlighted planned U.S. facilities in Georgia and New York and a site at the port of Antwerp-Bruges in Belgium. The 120MW Georgia facility is the first of 12 planned US sites that is due to come on line – with commissioning scheduled for 2025, according to Hyver. Projects by other developers for which Plug will supply electrolysers include Uniper's Maasvlakte site in Rotterdam, a project at the Sines refinery in Portugal and H2 Energy's 1GW facility at Esbjerg. The firm has since also announced plans to develop three major sites in Finland together with international partners.

> Let's learn how to walk safely, limiting the risk at the maximum, starting to ramp up the production and then we can run together for the gigawatt scale."

Devon Hyver, Director Sales and Market Development, Plug

Denmark's Ørsted is also developing projects across various countries, with its Senior Project Manager Hydrogen, Sandor Schrameyer, giving an overview of the plans. The firm's sites are partly focused on producing derivatives such as e-methanol, ammonia and jet fuels.

While the planned facilities are largely located in northwest Europe, the company is "slowly but surely also moving into the US, primarily as a result of the Inflation Reduction Act," Schrameyer said. Ørsted late last year took a final investment decision for the 70MW FlagshipOne e-methanol project in Sweden, standing out as one of the few European plants of this size for which this step has been taken. The site could eventually produce around 55,000t/yr of e-methanol from 7,000t/yr of renewable hydrogen and 53,000t/yr biogenic CO2 and is targeting the shipping sector off the coast of Sweden.



Germany's Uniper is looking to develop projects in several locations across Northwest Europe, specifically in the UK, the Netherlands, Sweden and at home in Germany, as the firm's Senior Manager for Asset Development, Marco Scholz pointed out. In his presentation, Scholz' primarily focused on the planned Maasvlakte site in the Netherlands.

The facility is to have 100MW electrolyser capacity in a first phase due to start in 2026, with Plug having been contracted to supply the PEM technology. In a second phase, the site's capacity could be expanded to 500MW by 2030, Scholz said. The facility is to use offshore wind power from a farm in the North Sea while it could supply its output to industrial offtakers in the port of Rotterdam region and beyond. Its design can serve as a "blueprint for other Uniper sites," Scholz added.

OFFTAKE

In two separate panel discussions that were part of The H2 Tech Series powered by bp, industry participants discussed the challenges around matching supply and demand, especially in light of the prevailing cost gap between clean hydrogen and conventional supply.

In a first discussion, Marcel Henneman, Managing Director for Bunge Food Solutions' refining business, highlighted the difficulties of switching away from natural gas as an energy source in the Netherlands. The Dutch government is keen to encourage the firm to look for alternative supply for a new site that is to come on line in two years. But it is not possible to opt for renewable electricity since the grid is full utilised, while there is no existing hydrogen grid that would allow for clean hydrogen to be supplied to Bunge's factory.

While finding offtakers remains a challenge, OCI sees some progress towards being able to sell low-carbon ammonia. "Slowly but surely we are finding customers that might be willing to buy the ammonia at the right price points," the company's Director for Sustainability in Europe, Sjoerd Jenneskens, said. The U.S. is seeing a lot more traction now than Europe, thanks to the hydrogen provisions under the Inflation Reduction Act, Jenneskens said. It will need a "powerful response" from European institutions to shift the focus back, he added.

Itske Lulof, Sector Head for Energy and Climate at Invest International, suggested that floors and ceilings for hydrogen prices could be set by governments to increase investment certainty for both suppliers and offtakers. Project risks can only be reduced when it is clear at what prices products can be sold, Lulof said. But Bunge's Henneman challenged the idea as a price floor for hydrogen production could require offtakers to raise prices for their end products, especially if competitors are still using natural gas. This would run counter to ideas of creating a level-playing field, he said. Lulof agreed that all parties would then have to switch and that a clear regulatory framework is needed.

According to Lulof, offtake agreements should ideally be for a duration of at least 15 years to make a project sufficiently attractive for financiers. This may not be realistic though given the amount of uncertainties that persist in the industry, Jenneskens argued. There will need to be more flexibility from financiers, but also from project developers themselves, he said. And in the case of ammonia sold to farmers, offtake agreements are anyways for much shorter durations, Jenneskens noted.

In the second discussion, the creation of a level-playing field was again noted as a key precondition for offtake agreements.

Jindal Steel's Head of Green Hydrogen Naveen Ahlawat said that interest is there in hydrogen-based steel products. "Customers are willing to give us a premium" as green steel would only increase overall costs of production by 1-2pc in many cases which "is nothing," Ahlawat said. Automotive manufacturing as well as production of wind turbines and consumer durables are key areas where he sees traction. And technological progress could substantially reduce costs for green steelmaking, thereby making it easier to find offtakers. Improvements in solid-oxide electrolyser technology could be particularly useful to bring down the cost of producing green steel as excess heat could be used in the process, Ahlawat said. Jindal hopes to produce the first green steel in Oman around 2026-27, he added.

The Port of Amsterdam expects to receive the first volumes of renewable hydrogen by 2027, with the aviation sector slated to be a key driver of the initial demand because of government mandates, The Port's Deputy Director Mark Hoolwerf said. One of the companies eyeing use of hydrogen to produce sustainable aviation fuels is Amsterdam-headquartered SkyNRG. Amsterdam will have hydrogen and CO2 pipelines that will make it possible to locate a SAF production plant there even if an electrolyser site is not in the immediate vicinity, the firm's Technical Director for EU Capacity Development, Mark Duppen, said. While demand for SAF will be driven by mandates for the aviation sector, production will still have to be "kind of competitive" with that elsewhere, such as in the US, the Nordics or Oman, Duppen said. "We don't need to match the fossil fuel price but it needs to be in a certain bandwidth and now it's off" which is what is keeping the firm from signing offtake agreements, he said. Argus is currently tracking 26 sites globally where SAF is to be produced using renewable hydrogen and the vast majority of these is located in Europe. Some developers have already managed to strike a substantial amount of offtake deals, such as US firm DG Fuels for its planned Louisiana site.

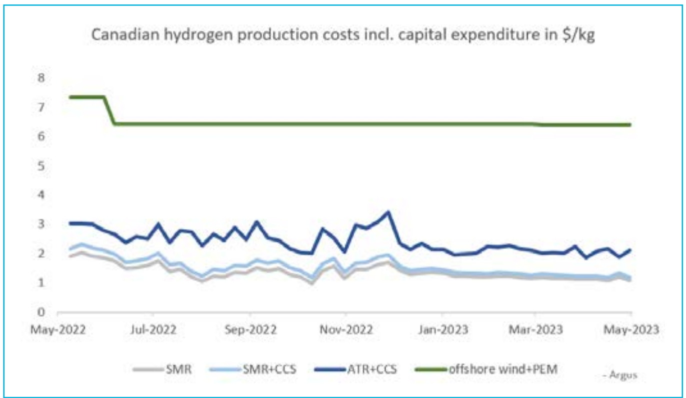
In terms of transport vectors, the Port of Amsterdam is looking at liquid hydrogen and liquid organic hydrogen carriers, as it will not build infrastructure for ammonia imports, Hoolwerf said. The port has said that it will not look to facilitate ammonia imports because of safety concerns in the densely-populated Amsterdam metropolitan region.

"We need all the stakeholders throughout the full supply chain to come to FID, to come to final investment decision at the same time."

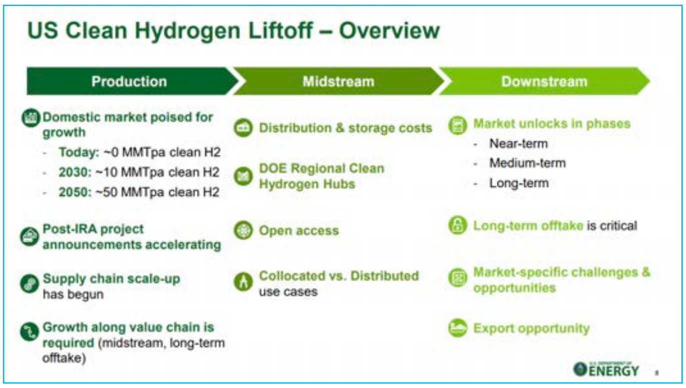
Madadh MacLaine
Secretary General, Zero Emissions Ship Technology Association

POLITICAL AMBITIONS

Blaine Higgs, Premier of the Canadian Province of **New Brunswick**, outlined the region's plans for low-carbon hydrogen which is to be exported and used "for building new clean industrial bases". The premier pointed to some of the province's favourable conditions and existing infrastructure for building a low-carbon hydrogen economy: abundant water, high wind power potential, ample natural gas reserves, a strong industrial base as potential offtakers, Canada's only LNG terminal and existing deep-water ports. In the longer term, hydrogen in the province could also be produced from nuclear energy provided by small modular reactors, Higgs said, adding that "the next-generation reactors are ideal for industrial decarbonisation and hydrogen production". New Brunswick will release a hydrogen roadmap in July this year.



Grace Quan of the **Canadian Hydrogen and Fuel Cell Association** highlighted the opportunities in Canada as a whole. In line with Higgs' comments, she stressed that the country is open to all production pathways with the focus placed firmly on carbon intensity. The country is looking at the initial development of three hydrogen hubs, but this could grow to 30 as the industry scales up, Quan said. Quan pointed to the several incentives provided for clean hydrogen production in the country, most notably the investment tax credits introduced earlier this year as part of the 2023 budget. These include a credit of up to 40pc for hydrogen production, depending on carbon intensity. Carbon contracts for difference could provide further incentives for companies looking at low-carbon hydrogen production, Quan added.



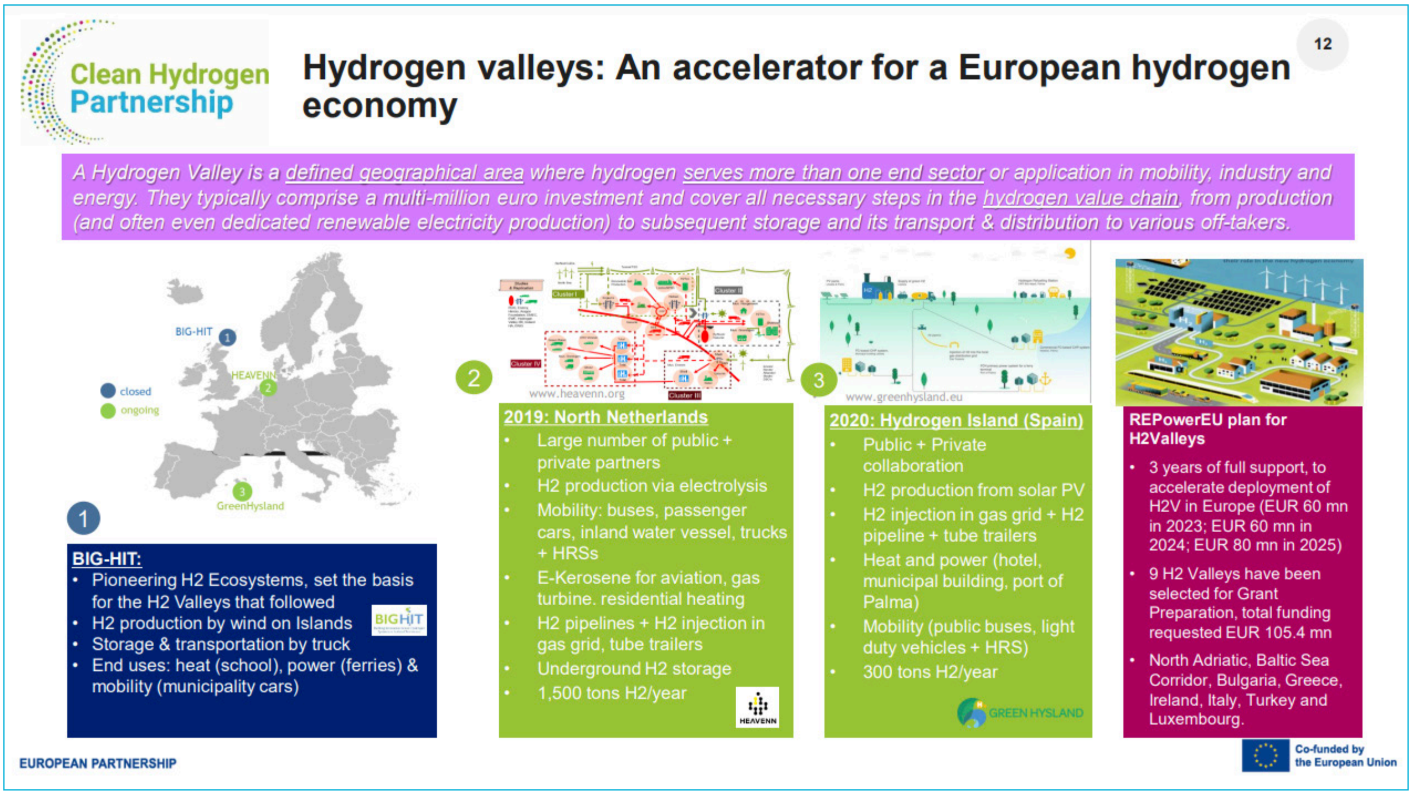
South of Canada, ambitions and opportunities in the hydrogen field are similarly huge, as the **U.S. Department of Energy's** Advisor at the Office of International Market Development, **Matthew Manning**, noted. Costs for hydrogen production "will come down tremendously" and the hydrogen industry presents a $80bn-150bn opportunity by 2050 in the U.S. alone, Manning said. The next 5-7 years will be decisive for the sector's development and the exact scale of the opportunity, he said, stressing that "we are at a really crucial point right now where decisions made will echo through the next two decades". U.S. policies, such as the hydrogen production tax credits and the hydrogen hub programme, should help put the country on track for net-zero emissions, with Manning estimating that 10-15pc of the U.S.' decarbonisation by 2050 is to be achieved through hydrogen. But Manning also cautioned that major challenges remain, especially in the midstream segment. "Right now a lot of attention is paid to production and less on the midstream," he said. Midstream projects tend to be forgotten because "no one likes building pipelines...transport vehicles or salt caverns". "But this is a really necessary part and can cause log jams in the future," he warned.

The technology that we have selected is what we see as, again, the future for non-carbon emitting energy source."

The Honourable Blaine Higgs
Premier, Government of New Brunswick

Looking at the other side of the Atlantic, **Bart Biebuyck**, Executive Director of the **Clean Hydrogen Joint Undertaking (JU)**, explained the approach of setting up hydrogen valleys in Europe. The JU is a public-private partnership bringing together the European Commission and industry bodies Hydrogen Europe and Hydrogen Europe Research. It is using EU funds to support projects and has so far allocated a total of €1.2bn of public funds to 314 projects, Biebuyck said. This has been matched by the same amount from industry, he added. The valleys are aimed at encompassing production facilities as well as offtakers in multiple sectors, including industry and mobility applications. As a next step, these valleys are to be connected, Biebuyck said. The latest round of support for 2023-24 is focusing in particular on hydrogen valleys in eastern European countries, for instance supporting projects in Poland, the Baltics, Greece, Romania and Slovenia.

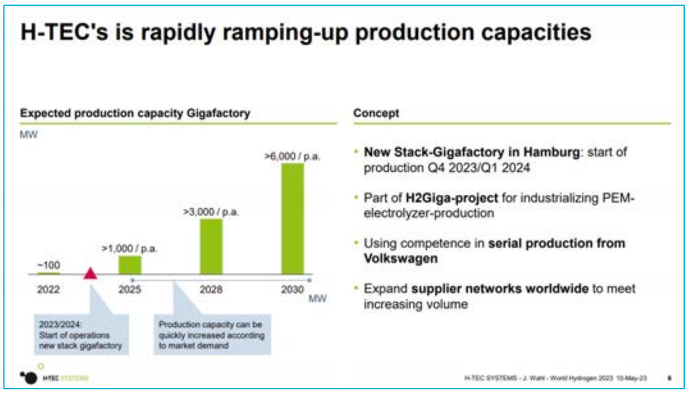
> We cannot get hydrogen because there is no network yet."
>
> **Marcel Henneman**
> Managing Director - Refining Business EMEA, Bunge Food Solutions

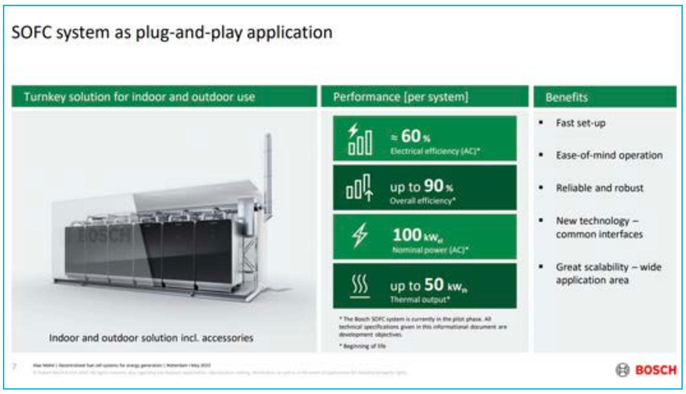


ELECTROLYSERS AND FUEL CELLS

German company **H-Tec's** Director for Product Management **Jonas Wahl** outlined the company's plans for electrolyser manufacturing. H-Tec is developing its proton exchange membrane (PEM technology in Augsburg in southern Germany and in April broke ground on a new manufacturing site near Hamburg. Wahl pointed to the company's 25 years of experience in PEM electrolysis and its backing from Man Energy Solutions which is part of VW. The firm intends to establish itself as a "top 3 player in the market," Wahl said. H-Tec's production capacity was 100MW/yr in 2022, but it aims to grow this to over 1GW/yr by 2025, over 3GW/yr by 2028 and over 6GW/yr by 2030, he noted.

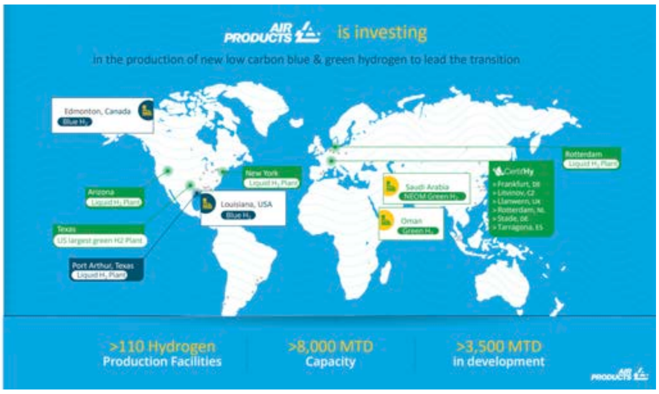
Alaa Mohd, Director of Sales for Solid Oxide Fuel Cells at Germany's **Robert Bosch GmbH** presented on solid-oxide fuel cell solutions (SOFCs) that could provide power in various applications, including for industry, data centres and in buildings and urban quarters. Based on a pilot phase, Bosch's SOFC systems could reach an overall efficiency of up to 90pc and electrical efficiency of up to 60pc, Mohd said. The comparatively high electrical efficiency in particular cuts operating costs, according to Mohd. The technology is intended as a "plug-and-play" solution with a "fast set-up", while being "robust and reliable" and offering opportunities for scale, he said.





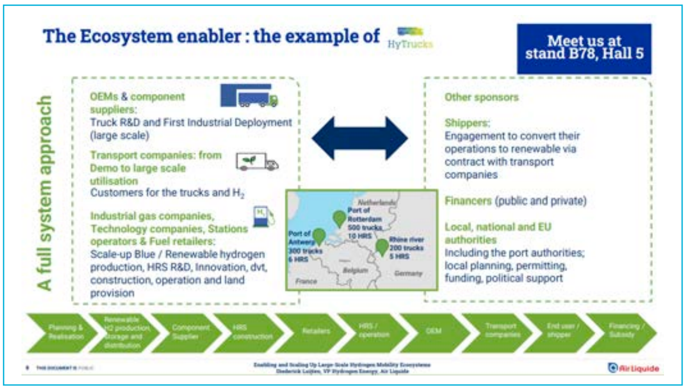
MOBILITY

Air Products' H2 for Mobility Product Manager in Europe, **Erwan Bruneau**, presented the company's joint project with the UK's Metrobus Crawley to convert the bus operator's fleet to hydrogen-powered vehicles. Metrobus Crawley operates a fleet of around 130 buses, of which an initial 54 are to be converted to run on hydrogen this year, Bruneau said. In general, Air Products aims to drive mobility decarbonisation projects forward by supplying its own hydrogen, while establishing and operating the required infrastructure. The firm is betting on liquid hydrogen in particular to increase storage and delivery capacity, Bruneau said. Bruneau also pointed to Air Products' various green and blue hydrogen production projects globally. He called on legislators to support decarbonisation efforts, partly through streamlining approval processes.



Fellow industrial gas firm **Air Liquide** is also pursuing new ventures in the mobility space, while building on its existing experience in the hydrogen space. The French company is working with several partners, as its VP for Hydrogen Energy in Northwest Europe, **Frederick Luijten**, explained. It is cooperating with Daimler on the development of refuelling stations, with TotalEnergies on setting up a refuelling network, with Faurecia on an on-board fuel tank system and with Iveco on heavy-duty truck development, Luijten said. He shed further light on some of Air Liquide's key projects, such as the HyTrucks initiative. The HyTrucks programme is looking to bring 1,000 hydrogen-powered trucks on the roads between three key northwest European harbours and logistics hubs – Rotterdam, Antwerp and Duisburg – by 2025-26. This specific project is to also include 25 refuelling stations, but Air Liquide has even more ambitious plans for refuelling stations overall. Together with TotalEnergies, it is planning to set up 100 stations offering fast refuelling for trucks across the Benelux countries, Germany and France, Luijten said.

Another French firm with large ambitions in the road transport space is **Hyvia**, a joint venture between Renault and the U.S.' Plug. The firm launched its Master Van H2 Tech transport vehicle during the World Hydrogen Summit. According to Hyvia's **Mehdi Ferhan**, the vehicle can travel up to 400km after completing the refuelling process which takes around five minutes.



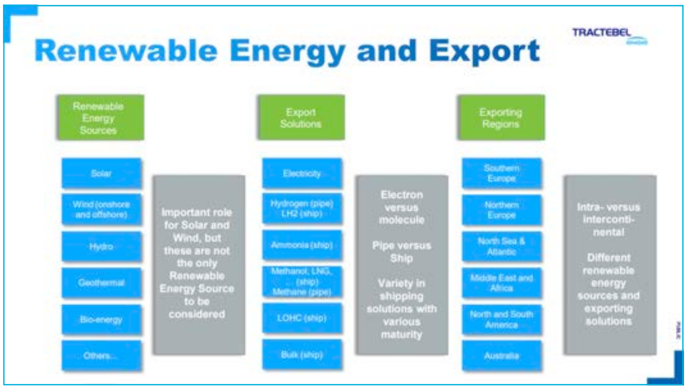
The vehicle has been certified for European commercialisation and is a "first of its kind" on the continent, Ferhan said. The company is working with a range of companies in France, the Netherlands and other countries that are early adopters and are looking to use the vehicle in their fleets. Hyvia will also provide all required services for the vehicle and plans to offer mobile refuelling stations as part of its package, Ferhan said.

Royal HaskoningDHV's Senior Investment Consultant **Michiel Nijboer** looked at the role that hydrogen and derivatives can play in the maritime sector. He outlined the key role that they may have to play in decarbonising shipping and different products' respective advantages and drawbacks. Shipping lines are still mulling different options and many have so far remained "technology-agnostic," he said. Shipping giant Maersk is among those having identified a clear favourite, with the firm betting heavily on e-methanol. According to Nijboer, e-methanol is the "most mature technology" and provides "advantages in handling and storage", but its production requires CO2 to be available. Port infrastructure will be a challenge for making large volumes of hydrogen-derived maritime fuels available, given that many of these products have a low volumetric density, Nijboer noted. Safety is also a key consideration, especially for ammonia. Most importantly, however, questions remain over "availability in the quantities that we need, at a place where we need them globally and at a price that is affordable and competitive," Nijboer said.

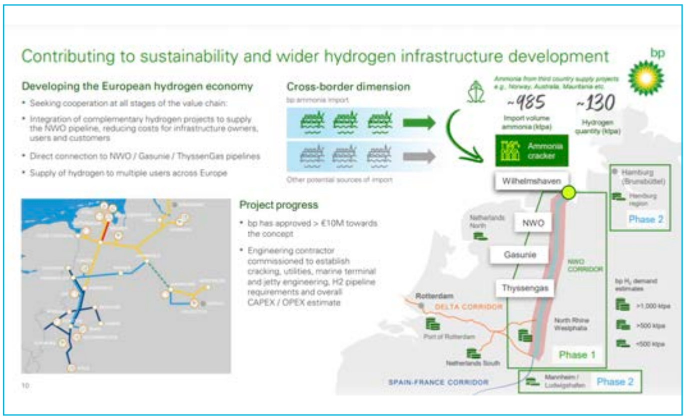
INFRASTRUCTURE, TRANSPORT AND STORAGE

Markus Kösters, Head of Commercial Development for EU and UK at **Lifte H2**, focused on hydrogen transport via compressed gas trailers. Existing transport via compressed gas trailers with 200-380 bar provides a "low-cost, very tested technology that is readily available on the market" from several manufacturers, Kösters said. But as projects scale up, bigger trailers will be needed and this could be achieved by increasing the pressure. "This is where higher compression becomes a solution," Kösters said. With larger production volumes, operating expenses fall thanks to higher pressure starting to outweigh higher capital expenditures for bigger trailers, he noted. Lifte H2 is also specialising in mobile hydrogen refuelling stations which — compared with stationary equipment — offer advantages of shorter lead times, fewer permitting requirements and the absence of costs for a construction site, according to Kösters.

Sven Goethals, Business Development Director for Energy at **Tractebel**, provided some insights into the company's thinking around hydrogen exports and potential carriers. In terms of carriers, all options — including ammonia, liquefied hydrogen and liquid organic hydrogen carriers (LOHC) — will likely have a role to play in the future, Goethals said. Tractebel is carrying out planning, design and engineering work on several projects, including some by parent company Engie. Among these are projects in Australia, Belgium, Chile, Egypt, Tunisia and Portugal. These not only include production sites, but in the case of Tunisia also involve developing an LOHC supply chain and in the case of Portugal entail studying the feasibility of liquefaction facilities.

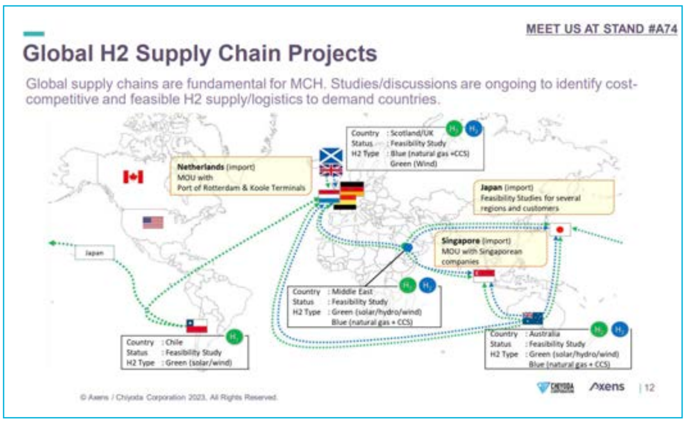


bp's Richard Denny, Business Developer for Northwest European hydrogen infrastructure, informed on his company's plans for setting up a hydrogen hub in Wilhelmshaven in northern Germany. At the core of the hub would be an ammonia cracker that could take 700,000-800,000t/yr of ammonia from bp's planned global projects, such as in Norway, Australia and Mauritania. The cracker could produce around 130,000t/yr of hydrogen that would then be delivered on to key industrial demand centres, such as Germany's Ruhr area. The company is currently in a conceptional design phase. It hopes to move to a front-end engineering design phase by 2025 and to start operations in 2028 "in a best case". There are multiple companies that may be able to provide the required cracking facility, Denny said. bp could work with other companies planning projects around Wilhelmshaven to build a hydrogen ecosystem there, he added.



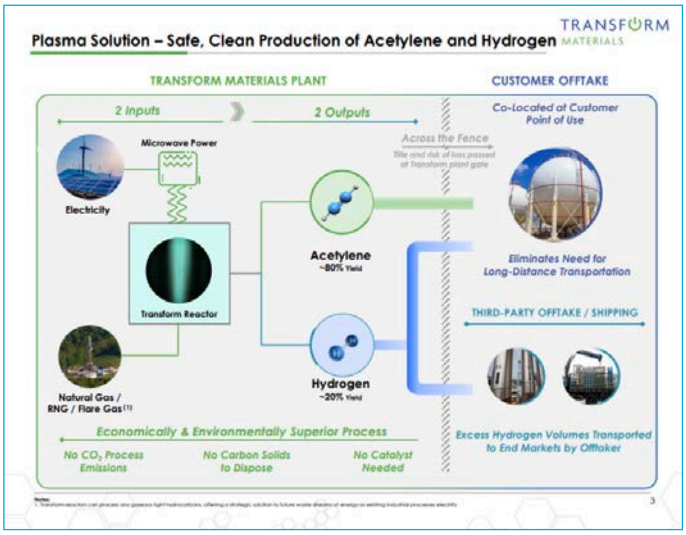
Among the companies developing technology for ammonia cracking is **Heraeus Precious Metals**. The firm is working on catalysts based on precious metals for various parts of the hydrogen supply chain, including to release hydrogen from ammonia, its Technical Sales Manager **Kai-Chin Chang** said. The company's technology enables ammonia cracking at comparatively low temperature, thereby saving energy, Chang said.

Liquid organic hydrogen carriers (LOHCs) could provide an alternative to using ammonia as a vector for shipping hydrogen. **Chiyoda Netherlands'** Managing Director **Osamu Ikeda** and **Axens'** Hydrogen Manager **Sébastien Lecarpentier** jointly presented on their companies' cooperation in the field of LOHCs, placing special emphasis on the methylcyclohexane technology. As part of the companies' cooperation, Axens will provide the hydrogenation technology, while Chiyoda will take care of the dehydrogenation process. The two firms can already offer the technology at industrial scale, Lecarpentier said. They are involved in several projects looking at building international supply chains using LOHCs, most of which are at a feasibility study phase. Japan, Singapore and continental Northwest Europe are targeted as key demand centres, while potential exports could come from Chile, Australia, the Middle East and Scotland, Ikeda said. In Singapore, Chiyoda is working with several partners and hopes to start commercial operations of its dehydrogenation plant by 2026. LOHCs could also be used for large-scale storage, Osamu noted.



INNOVATIVE TECH

Alex Shanosky, Vice President Business Development at U.S. firm **Transform Materials**, presented on his company's technology which produces hydrogen and acetylene from either electricity or natural gas. The processes involve a microwave plasma reactor and can take place on-site to avoid long-distance transportation, Shanosky said. It is an "economically and environmentally superior process" compared with other hydrogen production pathways, according to Shanosky. This is because it does not cause any CO2 process emissions, leaves no carbon solids to dispose and does not require catalysts, he said.



Diogo Quintão, Chief Operating Officer at **UTIS**, shed light on the company's hydrogen-based optimisation for continuous or internal combustion processes. Continuous combustion processes apply in industries such as cement or steam production, waste incineration and biomass combustion. UTIS' technology is intended to optimise these processes by reducing fuel consumption, increasing reliability and reducing environmental impacts. The technology can also be applied to internal combustions such as in vehicles, Quintão said. The Portuguese firm has installed 124 systems that are currently operational across 60 countries, he noted.

Australian firm **Hazer** has developed "an innovative methane pyrolysis technology", its chief executive **Glenn Corrie** said. Methane is converted into hydrogen and graphite and Hazer stands out from competitors through its use of iron ore as a catalyst, Corrie said. Iron ore is readily available at low costs, compared with materials used in other pyrolysis processes, he noted. Hazer's approach requires a "much lower process temperature compared to standard pyrolysis technologies," thereby reducing energy needs and costs, according to Corrie. Meanwhile, graphite could provide a larger target market than carbon black, which is the more common co-product of other pyrolysis technologies, he said.

Hazer's compatriot **Carbon280**, meanwhile, is focusing on storage solutions. Its Chief Executive **Mark Rheinlander** introduced the Hydrilyte technology for storing hydrogen which entails a metal hydride dust suspended in mineral oil. According to Rheinlander, the technology enables storage at lower cost than competing approaches, while it is safe, scalable and releases hydrogen with a high level of purity when it is heated. Trucks or ships that are used today could be used to transport the hydrogen stored with the help of Carbon280's technology, Rheinlander said.

Another company looking at innovative storage solutions is Canada's **Hydrogen in Motion**. The firm's Chief Technology Officer **Mark Cannon** said the firm has "engineered a material which absorbs hydrogen under low pressure" to "effectively act like a sponge". This solid-state storage system based on nanomaterials can be used in the same way as a regular compressed hydrogen tank but is "smaller, safer and cheaper," he noted. The system could help bring down costs for transporting and dispensing hydrogen significantly, according to Cannon.

BoMax Hydrogen is planning to use light for hydrogen production without electrolysers. The firm has patented technology with which it seems to harness light to activate catalytic reactions using natural enzymes, specifically a chaperone protein, the firm's Chief Executive Officer **Chris Simuro** and Chief Science Officer **Deborah Maxwell** said. The approach can produce "pure green hydrogen", Simuro said. Hydrogen could thus be produced at point of use and production would not require rare earth metals, he noted. The firm is planning to come to the market with a small-scale model next year and there is ample potential to scale the technology, according to Simuro.

> We have the chance to connect the solar and electrolyser directly, or the wind directly."
>
> **YE Yong**
> Vice President of Sales, Green Power Co., Ltd.

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Karen de Lathouder, CEO, bp Netherlands

A Roadmap to Scaling Up Green Hydrogen Production
Bas van den Beemt, Country Manager Sales - Netherlands, Lhyfe

From Ambition to Reality: Delivering Electrolysis Projects
Marie Khuny Khy, Electrolysis Product Line Director, Engineering & Construction, Air Liquide

New Tech Revolutionising Hydrogen Deployment
Markus Kösters, Head of Commercial Development, EU and UK, LIFTE H2

Powering our Economy and the World with New Brunswick Energy
The Honourable Blaine Higgs, Premier, Government of New Brunswick

Master the Energy Transition with a New Product Derivative of H-TEC SYSTEMS
Jonas Wahl, Director Product Management, H-TEC SYSTEMS

Green Hydrogen, How to Address the Challenge of Unstable Renewable Power
YE Yong, Vice President of Sales, Green Power Co., Ltd.

Role of Carbon in Clean Hydrogen Production
Alex Shanosky, Vice President Business Development, Transform Materials

Valorising Renewable Energy for Export
Sven Goethals, Business Development Director Energy, TRACTEBEL

Sustainable Hydrogen Systems
Diogo Quintão, Chief Operating Officer, UTIS

Large Scale Electrolyser Development from Idea to Implementation
Devon Hyver, Director Sales and Market Development, Plug Power

Converting a Bus Fleet to Hydrogen Fuel - Metrobus Crawley
Erwan Bruneau, H2fM Product Manager Europe, Air Products

Smart Flow Control for Hydrogen Efficiency
Guido König, Head of Focus Industries Management | Segment Manager for Sustainable Industries, SAMSON AG

Harnessing the Power of Nature to Create Green Energy
Chris Simuro, CEO, BoMax Hydrogen, LLC
Dr. Deborah Maxwell, Chief Science Officer, BoMax Hydrogen, LLC

Hydrogen Storage - Supporting Safety and Enhanced Availability through Lifecycle Management
James Taylor, Research and Development Manager, Chesterfield Special Cylinders

Hydrogen Off-takers Panel
Moderator:
Bart Biebuyck, Executive Director, Clean Hydrogen Joint Undertaking (JU)
Panellists:
Itske Lulof, Sector Head, Energy & Climate, Invest International
Madadh MacLaine, Secretary General, Zero Emissions Ship Technology Association
Sjoerd Jenneskens, Director Sustainability Europe, OCI Global
Marcel Henneman, Managing Director – Refining Business EMEA, Bunge Food Solutions

Securing Sustainable Supply of Critical Raw Materials for The Green Hydrogen Revolution
Moderator:
Cosima Sagmeister, Co-Lead Events, Women in Green Hydrogen
Panellists:
Petra Schwager, Chief, Climate & Technology Partnerships (CTP) Division, UNIDO
Elizabeth Minchew, Research Officer Climate Innovation and Business Development, International Finance Corporation (IFC)
Irina Gorbounova, Vice President M&A and Head of XCarb Innovation Fund, ArcelorMittal

Decarbonising Existing Gas Turbines with Cutting-Edge Hydrogen Retrofit Combustion Solutions
Peter Stuttaford, CEO, Thomassen Energy

Early Movers for Decentralised Hydrogen Power Generation
Marco Graaf, Senior Sales Manager Netherlands & Belgium, INNIO Jenbacher GmbH & Co OG

Decentralised Fuel Cell Systems for Energy Generation
Dr. Alaa Mohd, Director of Sales - Solid Oxide Fuel Cell, Robert Bosch GmbH

Enabling and Scaling Up Large-Scale Hydrogen Mobility Ecosystems
Diederick Luijten, Vice President Hydrogen Energy, North-West Europe & CIS, Air Liquide

H2 Opportunities in Newfoundland and Labrador, Canada
The Honourable Andrew Parsons, KC, Minister of Industry, Energy and Technology, Member for Burgeo – La Poile, Newfoundland and Labrador

CO2-free from Blois to Rotterdam: H2-ICE Enables Fast and Efficient Transportation
Mathieu Da Graça, Engine Control Manager H2 and Gasoline, BorgWarner

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The Place of Liquid Hydrogen in Mobility
Robin Le Corre, Hydrogen Leader – Group & Energy | Cryogenics, Fives Group

Challenges and Solutions to Finance Green Hydrogen Projects
Dr René Cotting, Chief Financial Officer, Smartenergy

Application of Liquid Hydrogen in Aviation and Heavy Industry
Christopher Boyle, Co-Founder and Chairman, Fabrum

Hydrogen Fuel Storage
Nick Herbert, Sales & Marketing Director, Luxfer Gas Cylinders Europe

Solving the Hen-and-Egg Problem - The H2 Mobility Alliance
Jens Wulff, Managing Director, NEUMAN & ESSER Deutschland
Michael Perschke, CEO, Quantron AG

How to Maximise the Uptime for Large Capacity H2 Compressors
Mathieu Robbe, Vice President Sales, Burckhardt Compression AG

Working with Regions to Support Building Hydrogen Valleys; An Accelerator for a European Hydrogen Economy
Bart Biebuyck, Executive Director, Clean Hydrogen Joint Undertaking (JU)

Condor H2 - A RH2INE Zero-Emission Shipping Project
Inga Soellner, Project Manager, NRW.Energy4Climate
Marjon Castelijns, Project Leader Condor H2, Darel Consultancy

Converting Waste to Renewable Fuels Without Combustion, The Other Green Hydrogen
Matt Murdock, Founder & CEO, Raven SR

Accelerating Innovation in the Hydrogen Ecosystem with Platform Zero
Iris Klingeman, Campus Manager, Platform Zero

DAY 2

Evaluating Hydrogen and Low Carbon Ammonia Imports for Germany
Richard Denny, Business Developer, bp

How Schneider Electric Can Support The Complete Hydrogen Value Chain
Bert Poort, Business Development Manager, Schneider Electric

Certification of Hydrogen: How to Reach a Global Consensus
Laurence Boisramé, Global Sales Director Hydrogen, Bureau Veritas

Hard to Abate Sectors: Spotlight on Maritime
Michiel Nijboer, Senior Investment Consultant, Royal HaskoningDHV

Innovative Leak Detection Technologies Driving Hydrogen Safety
Claudio Fecarotta, Business Development Manager - New Energies Fixed Gas & Flame Detection, MSA The Safety Company

Water Challenges for Hydrogen Production
Dionisio Visintin, Commercial Excellence and Hydrogen Manager Europe, Veolia Water Technologies

Lowering the Cost of Hydrogen
Matthew Manning, Advisor, Office of International Market Development, U.S. Department of Energy

Hydrogen Quality Monitoring Across the Value Chain
Orna Barash, VP of Product, NanoScent

Uniper's H2Maasvlakte Project - Project Status and Plant Concept
Dr. Marco Scholz, Senior Manager Asset Development, Uniper Hydrogen GmbH

Innovative Australian Hydrogen Solutions
Moderator:
Anna Freeman, Policy Director, Decarbonisation, Clean Energy Council
Panellists:
Mark Rheinlander, Founder & CEO, Carbon280
Glenn Corrie, CEO & MD, Hazer Group Limited
Peter Conway, Director, Energy Estate Pty Ltd

Power Suppplies for Large-Scale Electolysis; Lessons from Scaling to 100+MW
Bart de Vries, Business Development & Sales Manager, VONK

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Part 1: Canadian Hydrogen Sector Update | Part 2: Innovative Solid State Hydrogen Storage
Canadian Hydrogen Sector Update
Grace Quan, Board Member of CHFCA, Canadian Hydrogen and Fuel Cell Association
Innovative Solid State Hydrogen Storage
Mark Cannon, CTO, Hydrogen In Motion Inc. (H2M)

Hydrogen by Technip Energies - T.EN's Vision for Sustainability
Martin van 't Hoff, Sales Manager, Technip Energies
Stella Chatzisakoula, Process Engineer, Technip Energies

Dream Big When Starting Small: Modular and Scalable Hydrogen Solutions for Every Industry
Arthur Scheffer, COO/CCO/Owner, Adsensys

Hydrogen Off-takers Panel
Moderator:
Dr. Gökçe Mete, Senior Manager, Hydrogen & Industry Decarbonization, South Pole
Panellists:
Paul Vonk, Hydrogen Lead, Tata Steel
Mark Hoolwerf, Deputy Director, Port of Amsterdam
Mark Duppen, Technical Director Capacity Development - EU, SkyNRG
Naveen Ahlawat, Head - Green Hydrogen, Gasification and CCSU, Jindal Steel Group
Bente Bauknight, Head of Asset and Business Development, Hydro Havrand

Power Electronics: Optimising Hydrogen & Renewable Energy Systems
Harry Hiraoka, Sales & Technical Service Manager, SanRex Corporation

Future-proofing Electrolyser Power Electronics
Wouter van Gennip, Commercial Director, Prodrive Technologies

Spotlight on Green Hydrogen Developments in Denmark
Sandor Schrameyer, Senior Project Manager Hydrogen, Ørsted
Dr. Eva Ravn Nielsen, Chief Advisor, Power-to-X, Rambøll
Helge Vandel Jensen, Global Business Development Director, Power-to-X, Danfoss
Hassan Modarresi, Head of Section, COWI

HYVIA and Renault Netherlands: At the Forefront of Hydrogen Mobility
Mehdi Ferhan, COO, HYVIA
Anouk Poelmann, Country Director, Renault Group Nederland

Hydrogen Safety
Dr. Karina Almeida Leñero, Technical Lead – Energy Transition, Gexcon

Precious Metal Catalysts - The Key to Hydrogen Transport via Ammonia
Dr. Kai-Chin Chang, Technical Sales Manager, Heraeus Precious Metals

Which Electrolyzer is the Best For Your Large-Scale Water Electrolysis Plant?
Dr. Helmut Lademann, Managing Director, R2

Hydrogen Carrier LOHC-MCH
Osamu Ikeda, Managing Director, Chiyoda Corporation Netherlands B.V.
Sébastien Lecarpentier, Hydrogen Manager, Axens

Turbomachinery for Hydrogen
Daniel Patrick, Hydrogen and CCUS Application Manager, Atlas Copco Gas and Process

Role of Renewable IPP on Hydrogen
Cayetano Hernandez, Head of FRV-X, FRV
Felipe Hernández, Chief Innovation Officer, FRV

From Prototype, Proof of Concepts, towards Reliable Serial Design and Robust Production Processes for SOFC and SOEC Hot Balance of Plant Systems
Michel Dubuisson, Functional Engineer, BOSAL

Safe & Reliable Measurement Technology for the Hydrogen Economy
Roland Bonath, Business Development Manager, VEGA Grieshaber KG

Ensuring Compliance for Equipment Export
Leanne Halliday, Territory Manager and Global Hydrogen SME, LRQA

Ortho-Para Catalyst For Hydrogen Liquefaction
David Bostic, Vice President of Business Development, Molecular Products

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