

2023 Germany Korea Hydrogen Conference Report

The 4th German-Korean Hydrogen Conference took place in Seoul on the 31st October and the 1st November 2023. The conference was held in cooperation with the Fraunhofer Representative Office Korea, AHK Korea and 14 other co-organisers. It was supported by the German Federal Ministry of Economic Affairs and Climate Action (BMWK), the German Federal Ministry of Education and Research (BMBF) and the Korean Ministry of Trade, Industry and Energy (MOTIE). The event served the bilateral exchange of information and the promotion of economic and governmental cooperation between Korea and Germany. A total of over 200 experts and decision-makers from Korea and Germany took part in the two-day conference.



The first day of the conference began with an opening and welcome remark from Dr Byeungkwan Park, Representative of Fraunhofer Representative Office Korea. A congratulatory speech by Udo Philipp, State Secretary of the BMWK. He emphasised the importance of hydrogen as a leading technology on the path to climate neutrality. Germany and Korea are world leaders in the field of hydrogen, and the joint exchange further strengthens this position. Mr Philipp also highlighted the long-standing joint effort through the energy partnership between the two countries, which was concluded by BMWK and MOTIE in 2019.

Afterwards, Mr Kyungsung Kang, Vice Minister of MOTIE, gave a congratulatory speech in which he also

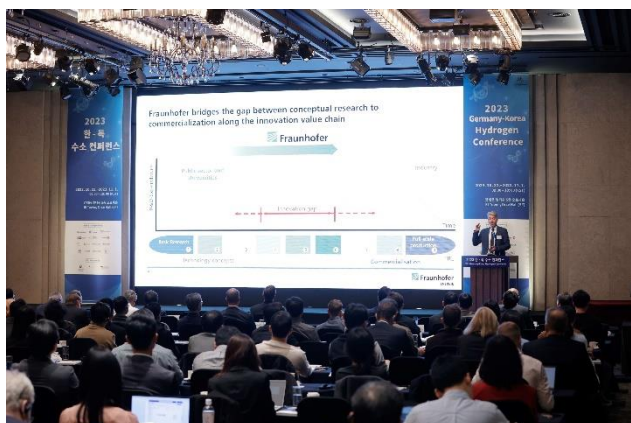
emphasised the importance of joint cooperation, as knowledge should not be isolated but shared. Mr Kang also highlighted that Korea has opened the world's first bidding market for hydrogen power this year. He looked forward to a lively exchange and co-operation during the conference and beyond.

This was followed by welcome speeches from Mr Jaedoo Moon, Chairman of H2KOREA, and Dr Bok Chul Kim, Chairperson of the Korean National Science and Technology Research Council, two co-organisers of the event. Both speakers emphasised the importance of exchanging information on hydrogen as a new, clean energy source. Especially in the face of climate change and geopolitical conflicts, the use of hydrogen can reduce the dependence on fossil fuels for both Korea and Germany.

The keynote speech was given by Dr Jens Brandenburg, State Secretary of the BMBF. Dr Brandenburg explained that Germany is pursuing the goal of generating 10 GW via hydrogen electrolysis by 2030. Although hydrogen would reduce the dependence on fossil fuels for both countries, Korea and Germany would initially have to import large quantities of hydrogen from abroad. Therefore, the exchange on the transport and safety of hydrogen, as discussed at the conference, is of great importance. Dr Brandenburg also called for greater international cooperation.

After a short break, the first substantive session of the day began on the topics of market trends, national strategies and political measures. Mr Beomsu Kim, Director of the Hydrogen Economic Policy Department of MOTIE, presented the Korean hydrogen strategy. The main objectives of the Korean government are to increase the domestic demand for hydrogen, to build a demand-orientated distribution infrastructure and to develop the national and international supply chain for clean hydrogen. This also includes the creation of institutional foundations for the hydrogen market.

Prof Christian Dötsch, Director of the Fraunhofer UMSICHT Institute, gave a brief insight into the political framework conditions in the EU and future technologies. He emphasised that, in the short term, the introduction of hydrogen from renewable energy sources will require additional political support aimed at rapidly reducing costs in comparison. At present, hydrogen from fossil fuels is still significantly cheaper than clean hydrogen.



Mr Hee-Beom Park, General Manager at the Hydrogen Policy Office KPX, then gave an overview of the market trends of the hydrogen market in Korea. The first bidding market for hydrogen has already been opened in Korea this year. However, this mainly relates to grey hydrogen, and a bidding market for clean hydrogen is also to be offered from 2024.

As the last presentation of the first session, Mr Markus Exenberger, Executive Director at H2Global, presented H2Global's ideas, intentions and instruments for the hydrogen market. He emphasised that H2Global, as a non-governmental organisation, can drive forward the expansion of hydrogen auction markets with its subsidiary Hintco.

As the last part of the session, a panel discussion among the speakers took place moderated by Dr Klemens Ilse, Deputy Director of Fraunhofer Innovation Platform-H2Energy. There the speakers shared opinions on what is needed to fast forward the launching of more projects to meet the net-zero scenario and also on necessary policy measures to

deal with the unexpected cost rise in the hydrogen market by inflation, logistical problems, or increased capital costs.

After the lunch break, the second session of the first day, moderated by Prof Chanhee Kim from KENTECH and a Vice President of the Korean Hydrogen & New Energy Society, followed with presentations on the topic of hydrogen production. Prof Christian Gebauer, Head of Research and Development of Hydrogen Systems at Heraeus Precious Metals GmbH & Co. KG, stated that various precious metals, such as iridium, are used for the important technology of water electrolysis and that their deposits are very scarce. For this reason, Prof Gebauer emphasised that, looking to the future, the recycling of these rare precious metals must be increased. Dr Klemens Ilse, Deputy Director of the Fraunhofer Innovation Platform H2Energy, also emphasised in his presentation that it is of the utmost importance to drive forward research into materials for hydrogen production and the associated upscaling of the green hydrogen market. Dr Sung Ho Chang, General Manager at KEPCO Hydrogen Institute, presented how the institute is strengthening hydrogen research in collaboration with KENTECH.

Mr Sebastian-Justus Schmidt, founder and CEO of Enapter, also emphasised in his presentation that a key aspect for the expansion of the hydrogen market, especially the green hydrogen market, must be cost reduction in production, for example through Enapter's Anion Exchange Membrane Electrolysis (AEM electrolysis). In this context, Dr Dong-Ha Lim, Director of the Korea Institute of Industrial Technology (KITECH), and Dr Simon Kühner, FIP Business Development Manager at Fraunhofer IWES, also emphasised the importance and expansion of renewable energies in their respective presentations in order to ensure the production of green hydrogen and to be able to actually pursue the common goal of climate neutrality.

After another short break, the third and final session of the first day on hydrogen logistics began with the moderation by Prof Markus Holz, Program Director for Logistics Management, Anhalt University of Applied Sciences. Mr Arnd Viets, Managing Director at

NEUMANN & ESSER, presented various H2 compressors that could make the distribution of hydrogen more efficient. Prof Thomas Gries, Director of the Institute of Textile Technology at RWTH Aachen University, presented his department's research into multifilament-wound composite pipelines, which could potentially be used as an alternative to conventional materials in the construction of H2 pipelines in the future. Dr Byeongyong Yoo, Vice President of HD Korea Shipbuilding & Offshore Engineering, presented research on a new hydrogen system for large-scale transport and storage of liquid hydrogen on ships. Mr Dominik Eichbaum, representing Mr Philippe Steiner from SPG Steiner GmbH, presented decentralised solutions for the distribution of hydrogen and the associated advantages. In addition, Prof Jihyun Hwang, Managing Director of the Fraunhofer Innovation Platform at KENTECH, presented the current state of development of the coastal hydrogen production and liquefaction platform for energy island projects in South Korea. Dr Philipp Hauser, Scientific Advisor at VNG AG, provided insights into the Bad Lauchstädt energy park, which is to be operated with green hydrogen and is currently under construction. The audience also gained an insight into the Korean government's planned clean ammonia infrastructure through a presentation by Mr Jin Hwan Jang, General Manager at the Korea National Oil Corporation. As a counterpart to Mr Jang's presentation, Mr Kai Ruske, Senior Consultant at cruh21 and TransHyDE Coordinator, presented the German plans around the transport and storage infrastructure of green hydrogen. After this presentation, the first successful conference day came to an end.

The second day of the conference began with an opening and welcome remark by Mr Joohyuk Kim, Deputy Head of Fraunhofer Representative Office. Afterwards, and followed by welcoming speeches from Dr Johann Feckl, Director of the Fraunhofer-Gesellschaft, Mr Holger Germann, Rep. Director Porsche Korea and Chairman of the Board of AHK Korea, and Dr Kerstin Rötzer, Member of the Presidium of the Federal Institute for Materials Research and Testing (BAM). There were also speeches by Dr Jinhan Lee, Head of the Safety

Research Department of Korea Gas Safety Corporation (KGS), Prof Jörg Bagdahn, President of Anhalt University of Applied Sciences, and Prof Euijoon Yoon, President of KENTECH.



The first session of the second day, which focused entirely on the use of hydrogen, began with an opening by the moderator, Prof Wang-yun Won, Department of Chemical and Biological Engineering, Korea University. The first presentation was made by Mr Patrick Schweiss, Programme Manager at NOW GmbH. He gave insights into the use of hydrogen in the mobility sector in Germany. Ms Ye-Eun Shin, Research Engineer at Hyundai Motor Company, then presented the quantitative risk assessment of hydrogen in the mobility sector developed by Hyundai Motor Company. Dr Fuh Wen Shiue, Vice General Manager at TÜV Rheinland, provided an insight into the regulations and certification of pressure equipment for hydrogen applications by TÜV Rheinland. Dr Daniela Lindner, Head of the Applied Hydrogen Technologies Business Unit at the German Aerospace Centre (DLR), provided insights into the design and simulations required to test the use of liquid hydrogen systems in aviation.

Dr Joonsik Park, Group Leader of the Hydrogen and Low-Carbon Energy R&D Lab at POSCO Holdings, then presented POSCO's R&D strategy. Mr Johannes Voss from the Low Carbon Technologies department of the Fraunhofer UMSICHT Institute presented the Carbon2Chem project, which aims to use emissions from steel production as a raw material for chemicals. Dr Jungmin Seok, Senior Research Engineer at Doosan Enerbility, presented the current status of the

development of hydrogen turbines at Doosan Enerbility. The session was concluded by a presentation by Dr Lénárd-István Csepei, Senior Scientist for Chemical Catalysts at the Fraunhofer IGB Institute, on important products and intermediates such as methanol and ammonia for the development of a sustainable industry.

After lunch, a panel discussion took place featuring Dr Jens Neugebauer, Head of the International Representative Office and Senior Advisors at Fraunhofer-Gesellschaft; Dr Sangjin Choi, Chief of the Global Strategy Team at the Korea Institute of Energy Research; Dr Georg Mair, Head of the Division Safety of Gas Storage Systems at BAM; and Prof Hongki Lee from Woosuk University. The panel was chaired by Prof Chinho Park, Vice President of KENTECH. The central theme of the panel discussion revolved around the imperative to strengthen research collaborations between Korea and Germany. The aim is to facilitate knowledge sharing, fostering an environment where both countries can advance their hydrogen economies.

After the panel discussion the last session of the conference on the topic of safety in handling hydrogen began. The session, moderated by Dr Georg Mair, began with an introduction to the activities of BAM by Prof Katharina Löwe, Head of the Chemical Safety Engineering Department, and the activities of KGS by Dr Jeong Seok Oh, Head of the Safety Research Department at the Institute for Gas Safety Research and Development at KGS.

Dr Kai Holtappels, Head of the Department of Safety of Energy Carriers at BAM, presented the H2Safety@BAM project, which tests various hydrogen pipeline configurations. Dr Teresa Orellana Pérez, Senior Scientist at BAM, presented the digital quality infrastructure for hydrogen refuelling stations, and Mr Yunyoung Yang, Director of Hydrogen Safety at KGS, provided the audience with insights into Korea's hydrogen economy and safety guidelines.



Afterwards, the next moderator Dr Bin Wang, the coordinator of H2Safe_collaboration project guided rest of the speakers to present further safety aspects; standards, building and city applications. Mr Philip Adam from the DIN Standards Committee for Containers and Compressed Gas Systems presented the roadmap for the standardisation of hydrogen in Germany. Mr Sungjong Kim, General Manager at the Korea Land, Infrastructure and Transport Technology Promotion Agency, spoke about various strategies for the realisation of hydrogen cities in Korea. The last lecture of the conference was presented by Dr Yangkyun Kim, senior researcher at the Korea Institute of Civil Engineering and Building Technology, on the topic of explosion relief analysis and construction testing.

This concluded two successful and informative conference days, which not only provided a comprehensive insight into German-Korean cooperation in the field of hydrogen, but also highlighted the latest developments, research findings and future challenges in the field. The conference brought together experts, decision-makers and stakeholders from both countries, who provided valuable impetus for the further development of the hydrogen economy through lively discussions and networking opportunities. The content presented ranged from political strategies to innovative technologies and safety aspects, and painted a comprehensive picture of the current dynamics and the joint commitment of both nations to a sustainable and climate-neutral future.