The EU Delegation to Japan and the EU-Japan Centre for Industrial Cooperation
Joint Webinar

Promoting Research and Innovation in Hydrogen
- Opportunities for Cooperation between the EU and Japan -

Wednesday, May 25, 2022 16:00-18:15 Tokyo/09:00-11:15 Brussels

（Summary by secretariate）

The opening remarks was delivered by Dr. Gediminas Ramanauskas (First Counsellor and Head of Science, Innovation, Digital), underscoring that hydrogen is a key priority for the EU, with a target of producing 10-million tons within the EU region by 2030. He further expressed the goal of fostering collaboration between the EU and Japan in research and innovation on hydrogen. On the Japanese side, Mr. Masaomi Koyama of METI (Director of International Affairs Office, Industrial Science and Technology Policy and Environmental Bureau) emphasized Japan's commitment to accelerating and expanding its hydrogen strategy, scaling up alternative energy in line with the Hydrogen Energy Ministerial Meeting since 2018.

Following the opening session, four speakers voice their opinions on the topic of *"Promoting research and innovation in hydrogen: policies and practices":*

Ms. Hélène Chraye, Head of Unit, Clean Energy Transition, Directorate Clean Planet, Directorate-General for Research and Innovation, European Commission
Ms. Chraye introduced the ambitious European hydrogen policy and current eco-system aligned with the Green Deal. Emphasizing cooperation in the European Research Area (ERA) and 200 million euros to double EU hydrogen valleys, the goal is to deploy over 50 hydrogen valleys by the coming years. At the current stage, the EU still produces limited amount of hydrogen and it is necessary to double the domestic production and imported green hydrogen level. To achieve this, increasing renewable hydrogen electrolysers and prioritizing Research and Innovation strategy (e.g., Horizon Europe, ERA, Mission on clean hydrogen) are critical for the development and improvement of the production process, for implementing circularity, and enabling global deployment.

Mr. Hiroki Yoshida, Deputy Director, Hydrogen and Fuel Cell Strategy Office, Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry of Japan
Mr. Yoshida outlined Japan's vision and actions in achieving a hydrogen economy. Following the 2050 carbon neutral declaration and Green Growth Strategy, Japan aims to expand hydrogen usage and reduce costs through Green Innovation fund projects. The revised strategic energy

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plan targets 1% hydrogen in the energy mix by 2030, with a goal of producing 3 million tons by 2030 and 20 million by 2050, costing less than 20 yen per Nm3. Japan plans to secure hydrogen through domestic production (Alkaline electrolyser plant in Fukushima, and PEM electrolyser plant in Yamanashi) and imports including liquified hydrogen from Australia or Methylcyclohexane (MCH) which can be stored in higher temperature. To further promote the hydrogen utilization in transportation, power and industrial sectors, demand and supply needs to be in vicinity, establishing regional connections such as port areas and local production facilities.

Dr. Xavier Montagne, Deputy Scientific Head of Energy and Sustainable Development Strategy, Ministry of Higher Education Research and Innovation of France
Dr. Montagne presented the French perspective, marked by the Hulot plan in 2018 and the National Acceleration Hydrogen strategy in 2020. The French national hydrogen strategy (2020-2030) focuses on decarbonizing heavy mobility, creating a carbon-free hydrogen sector, and developing electrolysis production capacity for industrial use. The strategy also supports extensive R&D, including the Priority Research Program and Equipment (PEPR), organized on four main axes: hydrogen production, storage, conversion and deployment.

Dr. Andreas ten Cate, Program Director System Integration, Institute for Sustainable
The Institute for Sustainable Process Technology (ISPT) in the Netherlands, aims to reduce 19.4 Mton CO2 annually in line with the climate agreement. Dr. Andreas ten Cate highlighted the ISPT Hydrohub Innovation Program, emphasizing on electrolysis-based sustainable hydrogen production for circular industrial chains. Acknowledging the pivotal role of hydrogen plants along shores powered by offshore wind, the ISTP innovation program collaborates with multiple partners to focus on Gigawatt-scale water electrolysis, addressing the challenge of aligning industry and offshore wind power scales by 2030. Presently, ISPT has developed a 1GW mega plant utilizing offshore wind power, set to be commissioned in a Dutch portal site by 2030.

In the second session, experts shared opinions on *"Opportunities for cooperation in hydrogen research and innovation between the EU and Japan"*

Professor Shin-ichi Orimo, Director, Advanced Institute for Materials Research (WPI-AIMR), Tohoku University
The professor discussed Hyodrogenomics, a hydrogen-based scientific projects spanning from 2018 to 2023 with a 1.2-billion-yen fund and 50 experts. Their focus is on creating innovative materials, devices and reaction processes for advanced hydrogen science in materials. The primary research strategy is to utilize the characteristics of hydrogen (densification, localization, migration and activation) to create an innovation material for instance reaction devices and processes. Furthermore, International collaborations across academic fields have yielded technologies such as high energy density all-solid-state batteries (using earth abundant metals Aluminum and Iron under high pressure), new conceptual rechargeable fuel cell, proton and

hydride based advanced devices, interface designed solar cell and steels etc.

Dr. Marie-Gabrielle Macherhammer, Area Manager, HyCentA Research GmbH (Austria)
HyCentA Research GmbH, Austria's Research Centre at Graz University of Technology since 2005, focuses on projects involving new electrocatalysis and the expansion of the H2 refueling station network. The Center puts effort in addressing the intermittent nature of renewables by using hydrogen for long-term storage. The research is structured along the value chain, covering electrochemical technologies (electrolyzers), infrastructure technologies (purification, compression, storage optimization), measuring systems, as well as mobile technology on land, water and air. Current projects include developing new electrocatalysts for PEM electrolysis system to enhance circular economy practices, on-site green hydrogen production for semiconductor fabrication, advanced gas quality measurement techniques for hydrogen refueling stations, and applications of hydrogen in the mobility sector.

Professor Dr. Mehtap Özaslan, Institute of Technical Chemistry, Technical University of Braunschweig (Germany)
Dr. Özaslan presented the Japanese-European Research Collaboration on New Affordable and Durable Electrocatalysts for Fuel Cells (NADC-FC). The research spans four areas: electrode material design, electrochemical reactions, development of electrochemical tools, and the use of advanced in-situ & ex-situ tools. One of the collaborations with Japan focuses on reducing the content of new metal for improved oxygen reduction reaction in fuel cells, optimizing catalyst materials and enhancing the lifespan of electro materials. Notably, the University of Yamanashi Fuel Cell Nanomaterials Center contributes expertise in producing high efficiency carbon support catalysts.

Takahiro Yabe, Director, International Affairs Department, the New Energy and Industrial Technology Development Organization (NEDO) (Japan)
NEDO, as a national research and development agency, drives the transition to a sustainable society through three core systems: circular economy (CCU, recycling), bioeconomy (biofuel, bioplastic) and sustainable energy (renewable energy, hydrogen). Mr. Yabe highlighted NEDO's active support for comprehensive hydrogen-related initiatives, spanning production, storage, transport and utilization to address energy conservation. The agency also collaborates with foreign institutions to invest in early-stage clean energy technologies for practical use post-2040. One hydrogen-related research initiative at Kyushu University, in collaboration with foreign college institutions (Julich GmbH in Germany, Imperial College London and Paul Scherrer Institute in Switzerland), focused on Efficient Intermediate Temperature solid oxide electrolysis cell.

Professor Stanislav Mišák, Centre for Energy and Environmental Technologies, VSB - Technical University of Ostrava (Czech Republic)

Centre for Energy and Environmental Technologies (CEET) to developing innovative methods, materials and technologies for modern, low-carbon and sustainable energy solutions, with a particular focus on hydrogen technologies aligned with national and international strategic documents. Over the 2019-2027 period, CEET aims to complete nine hydrogen technologies projects, ranging from creating an ideal environment for hydrogen technology implementation (innovation strategy, decarbonization impact study, and state energy conception redesign), to project-based studies enhancing efficiency in light-blue hydrogen fabrication (from waste), addressing the Czech Republic's meteorological conditions and renewable energy challenges.

Professor Jarosław Milewski, Head of Power Division, Institute of Heat Engineering, Warsaw University of Technology (Poland)
Poland has implemented a national hydrogen strategy, with operational hydrogen valleys supporting local innovation and investment in production, transport, and hydrogen solutions. Other hydrogen-oriented activities have been carried out at institutions including Warsaw University of Technology and Fuel Cell Poland Ltd, with a particular focus on the development of Molten Carbonate Fuel Cells and proton conducting solid oxide fuel cells.

Finally, Dr. Phillipe de Taxis du Poet, Managing Director of EU-Japan Centre for industrial cooperation closed the remark.

Q&A

- How might the adoption of a hydrogen strategy in Japan impact the reduction of greenhouse gases?
- Are there any EU policy documents or initiatives addressing the taxonomy of blue hydrogen and blue ammonia?