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NTU consortium aims to accelerate commercial usage of hydrogen in Singapore

The project will be supported by NUS and various industry collaborators in Singapore and Japan. PHOTO: NTU SINGAPORE

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SINGAPORE - Two local universities and industry collaborators aim to develop new hydrogen extraction technologies to accelerate the commercial usage of hydrogen as a renewable energy source in Singapore.

Nanyang Technological University (NTU) aims to create better catalysts and more efficient reactors for improving the efficiency of extracting hydrogen from liquid organic hydrogen carriers.

This project, which holds the promise of enabling a more efficient and economical transport of hydrogen, will be supported by National University of Singapore (NUS) and various industry collaborators in Singapore and Japan. This in turn could contribute to the expansion of global

hydrogen supply chains.

They aim to semi-commercialise the technology by 2025, and fully commercialise it by 2030.

NTU's announcement on Tuesday (March 29) comes a week after a new report said that hydrogen will likely play a key role in Singapore's move to reduce emissions from its power sector.

The aim is to get this sector, now responsible for about 40 per cent of national emissions, to reach net zero by 2050.

Hydrogen has been touted as a cleaner fuel compared to natural gas, as it does not release any carbon dioxide when burned. However, in order to be considered a green alternative, hydrogen has to be produced using renewable energy.

This makes it difficult for Singapore to produce low-carbon hydrogen locally, which underlines the need for global hydrogen supply chains.

Minister for Trade and Industry Gan Kim Yong noted during the budget debate on the Singapore Green Plan that one challenge is in transporting hydrogen in large volumes, over long distances, as the technology to transport liquefied hydrogen is not yet available at scale.

To be transported, hydrogen has to be cooled to -253 deg C, where it is liquefied before it can be transported by tankers, similar to liquefied natural gas.

Alternative carrier forms of hydrogen, such as ammonia and liquid organic hydrogen carriers, are more easily transported, but come with their own challenges, such as the need to extract hydrogen from the carriers at the destination, Mr Gan noted.

NTU's president Subra Suresh said that this project, which is supported by the Government's Low-Carbon Energy Research Funding Initiative, will help to contribute to the design of a cost-effective hydrogen supply chain network for Singapore.

It will also draw on expertise from Japanese engineering firm Chiyoda Corporation, which has already developed hydrogen storage and transportation technology at ambient temperatures, known as Spera Hydrogen.

Other industrial collaborators include PSA Corporation, Sembcorp Industries, City Energy, Jurong Port, Singapore LNG Corporation and Mitsubishi Corporation.

"The ultimate goal is to reduce the global costs of hydrogen transportation and make hydrogen a viable alternative to conventional fuels, based on state-of-the-art facilities," Prof Suresh added.