



FUTURE ENERGY EXPORTS
Cooperative Research Centre



서울대학교
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Seoul National University showcases Future Energy Exports CRC’s industrial scale low-pressure liquefied CO₂ shipping research project to the Korean CCUS industry

On Wednesday 24th April 2024, Seoul National University (“**SNU**,” Republic of Korea) hosted members from the Korean and Australian government, and representatives from the Korea CCUS Association and other Korean carbon, capture, utilisation and storage (“**CCUS**”) industry stakeholders to showcase its participation in the Low Pressure Technology Liquefied CO₂ Research and Development Project (“**LP LCO₂ Project**”) and its state-of-the-art research facility aimed at unlocking the secrets on how the world can efficiently and safely transport large volumes of the greenhouse gas.



Led by the Future Energy Exports Cooperative Research Centre (“**FEnEx CRC**”), the LP LCO₂ Project is conducted at the University of Western Australia (“**UWA**,” Australia) and SNU, and also involves collaborative R&D work with Curtin University (Australia) and deepC Store (Australia). Low Emission

Technology Australia (Australia), JX Nippon Oil & Gas Exploration Corporation (Japan), Mitsui O.S.K. Lines (Japan), and Osaka Gas (Japan) are also participants in this R&D effort.

The LP LCO₂ Project studies the phase behaviour and boil off characteristics of liquefied CO₂ under dynamic operating conditions and assess the impact of non-CO₂ components.

SNU Professor Yutaek Seo and FEnEx CRC CEO and UWA Professor Eric May said today's event was an important milestone to showcase the LP LCO₂ Project and the collaborative R&D capabilities of Australia and Republic of Korea for addressing key global decarbonisation challenges to the Korean CCUS industry stakeholders.

"This R&D effort aims to lower cost barriers and enhance the readiness of industrial-scale liquefied CO₂ transportation technology. Successful research in this area will help maximise economic opportunities for the Republic of Korea and Australia, as well as forge increased international collaboration and cooperation vital to achieving our decarbonisation goals," they said.

Trade & Investment Commissioner of the Australian Trade & Investment Commission and Australian Embassy Korea Mr Dane Richmond said, "Korea and Australia enjoyed a long history of warm relations and great economic complementarity. Now more than ever, the two nations need to work closely to address the challenges of the future, including climate change. The Australian delegation's visit to SNU, where I had studied Korean over twenty years prior, was a sign that this collaboration was well underway. There is always more we can do but the direction of Australia – Korea relations was trending in a very positive direction, leaving me optimistic for the future."

Korea CCUS Association (KCCUS) said, "Many Korean businesses are expressing significant interest in promoting cross-border CCS in partner countries, including Australia," and added "as a public-private partnership organisation, KCCUS will sincerely support the activities of the government and businesses and academia such as Seoul National University to create positive synergies."

SNU Professor Yutaek Seo said, "Transporting liquefied CO₂ may look like an existing technology, but the industry has never been transporting liquefied CO₂ commercially under the conditions in this project. We aim to fill the technology gap between capture and injection, establishing the complete CO₂ value chain. This cannot be done alone in Korea; research partners in Australia are vital to achieving this goal."

Professor Yutaek and Professor May said the current design of liquefied CO₂ ships has a limited storage volume due to their operating pressure and temperatures.

"Low pressures and low temperatures are considered one of the best options to significantly reduce costs for CO₂ ship design. However, moving liquefied CO₂ by ship under low pressure and low temperatures conditions has not yet been undertaken at commercial scale. Therefore, it is necessary to address operational risks and enhance the likelihood of technical feasibility by maturing the technologies needed to safely and efficiently ship large quantities of CO₂ at facilities such as SNU."

Professor May said the project was one of many FEnEx CRC has underway aimed at assisting Australia and the broader Asia Pacific region decarbonise their energy solutions.



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ABOUT THE LP LCO₂ PROJECT

The LP Technology LCO₂ R&D Project is a partnership involving the FEnEx CRC, JX Nippon Oil & Gas Exploration Corporation, Low Emission Technology Australia, Mitsui O.S.K. Lines, Ltd., and Osaka Gas Co. Ltd.

The Project will be executed by FEnEx CRC, University of Western Australia, Curtin University, Seoul National University and deepC Store Pty Ltd. It includes:

1. Conducting experiments using laboratory scale facilities (such as pressure cell and boil-off apparatus) to study the phase behaviour and boil off characteristics of liquid CO₂ under dynamic operating conditions and the impact of non-CO₂ components;
2. Incorporating new data into custom engineering models for CO₂ boil off and phase behaviour calculations developed by the FEnEx CRC and using the new data to test predictions made with existing software tools; and
3. Designing pilot-scale CCUS demonstration tests or project needed to validate the engineering models anchored to laboratory data that can be upscaled as part of a subsequent project.

About SNU

The Seoul National University was founded in 1946 with the primary aim of producing intellectual elites who would lead the country and shape the future of its people. In the age of energy transition, the Seoul National University stands as a leading academic community to advance scientific discovery and facilitate knowledge exchange with international collaboration.

Decarbonizing the fast-evolving industry is central to Korea's economy by addressing the new challenges. Professors and Researchers at the university are actively working on government- and industry-funded research projects to tackle climate change.

About FEnEx CRC

The Future Energy Exports Cooperative Research Centre (FEnEx CRC) is an Australian not-for-profit organisation striving to decarbonise liquefied natural gas exports and grow clean hydrogen production.

Established in 2020 as a research-driven charity, the FEnEx CRC brings together 37 industry, government, and university partners with resources of approximately \$166 million to conduct industrial-scale research that supports LNG and Hydrogen exports from Australia.

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