We can generate green hydrogen, but how will we store it?

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University of Canterbury Senior Lecturer Dr David Dempsey and Professor Andy Nicol. Credit: University of Canterbury

Generating green hydrogen—hydrogen produced from water using renewable electricity—is a seasonal task that relies on factors such as

excess water in hydro lakes or wind. Once generated, the next challenge is storage.

Hydrogen is currently stored in tanks, but University of Canterbury researchers Professor Andy Nicol and Senior Lecturer Dr. David Dempsey are leading research to discover how to store large quantities of green hydrogen underground. This would enable Aotearoa to become more energy efficient, and support growth and decarbonization of the country's economy.

An expert in Structural Geology, Professor Nicol says their aim is to determine the "where" and "how" for putting hydrogen underground and getting it back out again. To do this, the research team will work alongside iwi across Aotearoa from the beginning of the research.

"We've found over the last 100 years that it's possible to store methane gas underground in the small gaps or pores in rocks. No one's stored hydrogen in rocks, so we don't know if it's feasible yet, which is why our first priority is to find out if it's possible," he says.

"Funding would allow us to work with the right groups to identify whether this approach to storing green hydrogen would be possible, as well as appropriate from all perspectives, especially those of tangata whenua.

"We know you have to start these discussions early. Now is the time to start engaging, not in 10 to 15 years' time when something like this could be implemented. The intention is that everyone knows what we want to do and has opportunities to address any concerns at the beginning of the project."

This research is becoming crucial, Professor Nicol says, as Aotearoa moves away from using fossil fuels.

"The New Zealand energy system has a disconnect in the sense that we generate a lot of energy through different means. Right now, we burn a significant amount of coal, oil and gas, and green hydrogen will be important for transitioning away from fossil fuels," he says.

"Our research could benefit the New Zealand economy if we generate and store enough hydrogen to export, while also helping to meet the country's energy needs with fuels that don't cause climate issues."

Provided by University of Canterbury