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## World first hydrogen pilot for low carbon alumina

On behalf of the Australian Government, The Australian Renewable Energy Agency (ARENA) has today announced \$32.1 million for Rio Tinto and Sumitomo Corporation to trial hydrogen calcination technology at the Yarwun Alumina Refinery in Gladstone, Queensland.

The \$111.1 million 'Rio Tinto and Sumitomo Corporation Yarwun Hydrogen Calcination Pilot Demonstration Program' will be the first-of-its-kind deployment of hydrogen calcination in the world.

The project is intended to reduce emissions in alumina refining, which currently contributes roughly three per cent of Australia's greenhouse gas emissions.

The project will consist of a 2.5 MW on site electrolyser to supply hydrogen and a retrofit of one of the refinery's calciners to operate with a hydrogen burner.

Sumitomo Corporation will own and operate the electrolyser at Rio Tinto's Yarwun site and supply the hydrogen to Rio Tinto directly. The electrolyser will have a production capacity of more than 250 tonnes of hydrogen annually.

Rio Tinto will conduct a series of tests of the hydrogen calciner under differing operating conditions to validate suitability and performance.

Calciners, which use high temperatures to extract chemically bound water from alumina crystals, traditionally use fossil fuels for process heat and contribute roughly 30% of emissions from [alumina refining](#).

Hydrogen calcination also produces high purity steam, which unlike contaminated steam from fossil fuel calcination, can be recycled for use in other stages of the refining process.

If successful, the project will demonstrate the viability of hydrogen calcination and pave the way for adoption at scale across other alumina refineries.

The demonstration follows a successful feasibility study conducted by Rio Tinto, which ARENA supported with a \$580,000 grant in 2021.

ARENA CEO Darren Miller said the project is an important step in the development for hydrogen calcination and the decarbonisation of the alumina production process.

"This world-first pilot looks to prove a promising technology for decarbonising one of our most emissions intensive industries," Mr Miller said.

"Having already backed an encouraging feasibility study, we're excited to be working with Rio Tinto and Sumitomo Corporation to build on that success and trial hydrogen calcination in the field.

"If this pilot project is successful, it could be a game changer for Australian alumina production, paving the way for deployment across the industry, and underscoring the importance of low-cost green hydrogen to decarbonise our largest industrial emitters. ARENA will continue to support projects at this scale as we develop other larger programs, such as Hydrogen Headstart."

Australia is the world's largest exporter of alumina, the mineral feedstock for aluminium production, with the industry contributing \$7.5 billion to the nation's GDP.

ARENA's [Alumina Decarbonisation Roadmap](#) (the Alumina Roadmap), published in 2022, identified hydrogen calcination as one of four technologies that could reduce emissions from Australia's alumina refineries by up to 98%.

ARENA has been investing in projects to reduce emissions from the aluminium value chain since 2021. This includes providing funding to Alcoa to investigate electric calcination and trial mechanical vapour recompression, two further technologies identified in the Alumina Roadmap.

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