Rio Tinto to develop BioIron™ R&D facility in Western Australia to test low-carbon steelmaking

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Rio Tinto will invest US$143 million (A$215 million) to develop a research and development facility in Western Australia to further assess the effectiveness of its low-carbon ironmaking process, BioIron™, to support decarbonising the global steel value chain.

The development of the BioIron Research and Development Facility in the Rockingham Strategic Industrial Area, south of Perth, follows successful trials of the innovative ironmaking process in a small-scale pilot plant in Germany.

BioIron uses raw biomass and microwave energy instead of coal to convert Pilbara iron ore to metallic iron in the steelmaking process. When combined with the use of renewable energy and carbon-circulation by fast-growing biomass, BioIron has the potential to reduce carbon emissions by up to 95% compared with the current blast furnace method.

The BioIron facility will include a pilot plant that will be ten times bigger than its predecessor in Germany. It will also be the first time the innovative steelmaking process has been tested at a semi-industrial scale, capable of producing one tonne of direct reduced iron per hour. It will provide the required data to assess further scaling of the technology to a larger demonstration plant.

The plant has been designed in collaboration with University of Nottingham, Metso Corporation and Western Australian engineering company Sedgman Onyx. Fabrication of the equipment will begin this year, with commissioning expected in 2026. These works are expected to support up to 60 construction jobs.

The research and development facility will employ around 30 full-time employees and include space for equipment testing to support further scaling up of the BioIron technology, while developing a workforce highly skilled in steel decarbonisation and supporting WA universities and research organisations.

Rio Tinto Iron Ore Chief Executive Simon Trott said, "The world needs low-carbon steel to reach net zero, and we are working to make this a reality by finding better ways to turn our Pilbara ores into steel.

"BioIron is a world-first technology that has the potential to play a significant role in a low-carbon steel future.

"This research and development facility will further test the BioIron process, showcase Western Australian innovation capability, and further demonstrates Rio Tinto's commitment to supporting and enabling the decarbonisation of the steel industry."

Western Australian Premier Roger Cook said, "As one of the world's largest iron ore producers, it just makes sense for WA to lead the world when it comes to low-emission steelmaking.

"Our plan to turn WA into a renewable energy powerhouse opens up massive economic opportunities for the future, like producing low-emission steel right here at home.

"Processing iron ore in WA will create jobs, reduce the world's carbon emissions and help to diversify and strengthen our economy for decades to come.

"This is another job-creating clean energy project in our industrial heartland of Kwinana and Rockingham, part of our commitment to transitioning the industrial strip to a clean energy future."

Note to the editors

Fly through and B-Roll vision of the Western Australian BioIron Research and Development Facility is available to download here.

Steelmaking accounts for 8% of the world's carbon emissions, and 69% of Rio Tinto's Scope 3 emissions in 2023.

BioIron was invented by Rio Tinto's steel decarbonisation team after a decade of extensive research.

Electricity consumption in the BioIron process is about one-third of the electricity required by other steelmaking processes that rely on renewable hydrogen.

BioIron uses raw biomass such as agricultural by-products like wheat straw, barley straw, sugarcane bagasse, rice stalks, and canola straw, instead of coal as the reducing agent.

Rio Tinto is aware of the complexities around the use of biomass supply and is working to ensure only sustainable sources of biomass are used. Through discussions with environmental groups, as a first step Rio Tinto has ruled out sources that support the logging of old growth and High Conservation Value forests.

For more information about the BioIron process, please see here.

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