

PROJECT SUMMARY

RP1.009: TESTING OF AUSTRALIAN IRON ORES IN A HYDROGEN DIRECT FLASH SMELTING PROCESS

OVERVIEW

There is a strong international push towards the development of Hydrogen DRI processes that are likely to have significant impact on the desirability of Australian Iron ores in future iron ore markets. There are several options available for Hydrogen DRI processing of Australian Ores, they include Shaft processes (e.g. Midrex), fluidised bed and Flash Smelting. Flash Smelting involves rapidly reacting fine iron ore in a hot gaseous environment and is distinct from a fluidised bed by (a) the particles fall through a shaft and are collected after reaction at the bottom of a shaft and (b) no bed structure is established in the furnace. A Flash Ironmaking process using Hydrogen has been developed by the Sohn team in the USA over the last decade. There is significant published data on the Sohn laboratory work but limited data on how the process works for different ores or the techno-economics of the process. Calix, an Australian based company with a background in calcining technology has been developing a new flash ironmaking technology over the last twelve months called ZESTY (Zero Emissions Steel Technology) based on its commercialised electrically heated flash calcination technology.

PROJECT DETAILS

This project will leverage the significant iron ore processing expertise and industry network brought together by HILT CRC to accelerate the development of Calix's ZESTY technology to deliver a low-carbon, cost-competitive and scalable technology for iron ore processing. The key objectives are to identify the most prospective Australian iron ores for ZESTY processing and provide important process and product data to inform and de-risk the design of the ZESTY demonstration plant. The goal of this project is to evaluate the potential of Calix's ZESTY technology for processing a range of Australian iron ores to a low-carbon DRI product using their pilot facility in Bacchus Marsh to establish critical parameters, such as (i) degree of metallisation, (ii) throughput and productivity, (iii) energy consumption and (iv) yield.

IDENTIFIED PATHWAYS

Alternative low-carbon ironmaking.

OUTCOMES

This project addresses the need to evaluate the potential of a Flash Smelting Hydrogen route for Australian Ores. It is expected that the outcomes will inform Calix's ZESTY FEED study and subsequent studies by HILT CRC looking at scientific/technical aspects of the process, techno-economic assessments and the design of a dedicated ZESTY demonstration facility.

PROJECT LEADER

- Professor Geoff Brooks, Swinburne University of Technology

INDUSTRIES

- Iron & Steel

TOTAL PROJECT VALUE

- \$574,693 (cash and in kind)

COMMENCED

01 June 2023