# De-risking large-scale Australian fine-ore hydrogen ironmaking

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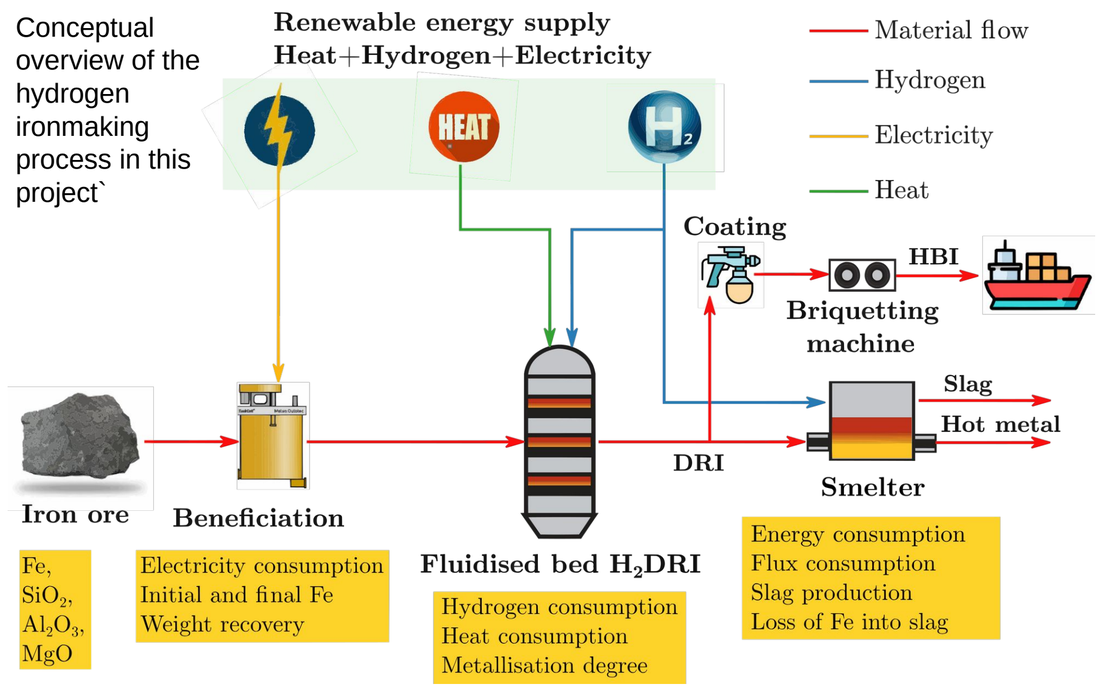
## Project aim and overview

This project seeks to de-risk key aspects of hydrogen direct reduced ironmaking as applied to Australian Pilbara ores via:

- experiments to improve understanding of fluidised bed reactor kinetics and the prevention of particle sticking,
- developing novel fluidised bed reactor designs for improved control of temperature and residence times,
- analysing the end-to-end process technoeconomics including for alternative ores, seeking least-cost pathways,
- evaluating a safe shipping method for lower-grade hot briquetted iron (HBI), and
- developing a novel smelting process adapted to these ores.

Conceptual overview of the hydrogen ironmaking process in this project`




## Methods

Project will advance these topics via:

- Lab-scale fluidised bed reactor and tube furnace testing with a range of iron ore and hydrogen under varied conditions, including with anti-sticking particle coatings.
- Thermogravimetric analysis (TGA) and differential scanning calorimetry (DSC)
- Modelling and testing of novel fluidised bed reactor configurations, in both cold- and hot-flow configurations.
- Generalised kinetic models of hydrogen reduction to support scaled-up reactor design.
- Experimental testing of novel HBI production methods for improving safety in shipping.
- Design and experimental testing of a novel smelter.
- End-to-end technoeconomic modelling the benefit of alternative process options.
- Pre-feasibility study of one or more successful project concepts by professional engineering consultants.

## Expected outcomes

The project will yield fresh insights into cost-effective hydrogen DRI production from Pilbara ores. Experimental and techo-economic R&D will be followed by a professional pre-feasibility study in the second phase. Outcomes include:

- Technology for low-emission production of steel.
- Improved feasibility and cost-effectiveness for Australian ores in emerging green steel production processes, targeting a 10% cost reduction from a combination of the technologies developed.
- Improved research capacity for iron and steel in Australia
- Increasing technology readiness level and decreased risk.
- A plan for upscaling and commercialising the most promising concepts to support Australia's green steel platform.

## Timeline and next steps

R&D Phase: 3 years
Commercialisation phase: 1 year
Commencement: March 2024

## Project partners

Swinburne University of Technology
The University of Newcastle
HILT CRC Limited
FMG Procurement Services Pty Ltd
Grange Resources (Tasmania) Pty Ltd
Roy Hill Holdings Pty Ltd
Primetals Technologies Austria GmbH

## Further information

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