

The Production of Green Steel via HIs melt

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ABSTRACT

The HIs melt technology was developed and proven in Western Australia after more than 30 years and several billion dollars of research and development. The HIs melt technology was transferred to China and is now successfully operating at the Molong plant in Shandong Province, China using WA iron ore fines as the major feedstock. Several more plants are under construction in China, and the technology has been approved by the Chinese Government as an environmentally acceptable alternative to the blast furnace.

The unique flexibility of the HIs melt process offers multiple pathways to decarbonise the production of steel in the near future. These pathways include:

- Use of sustainably grown biomass converted to biochar to replace coal as the reductant
- Pre-reduction of iron ore fines using hydrogen or biomass to direct reduced iron (DRI) powder
- Capture of carbon dioxide from the HIs melt offgas and geo-sequestration underground

These pathways are highly suitable for the Australian iron ore industry as they utilise:

- The large areas of land and long growing season available in Australia for the production of large tonnages of sustainably grown biomass
- Coarse iron ore fines directly without the need for fine grinding and pelletising
- Existing oil, gas and other underground gas reservoirs to store carbon dioxide

The HIs melt technology will allow Australia to transition from “Asia’s quarry” to Asia’s supplier of low cost, low carbon and high quality metallics that are required to produce “green” steel with net zero carbon dioxide emissions. In addition, HIs melt pig iron can be converted locally into steel via electric-arc or basic-oxygen steelmaking furnaces to supply all of Australia’s demand for green steel.