Update on the HIsmelt Technology

From HIsmelt 1.0 to HIsmelt 3.0

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Recap on HIsmelt Development

- Developed by Rio Tinto with over 30 years and $1 billion starting in 1980's with small scale pilot plant in Germany
- Pilot plant operated in Kwinana, Western Australia in 1990's
- 2005 to 2008 first commercial HIsmelt plant operated in Kwinana
- Purchased by Molong Petroleum Machinery 2012
- Yangkou plant and HIsmelt technology purchased by the Luli Group in 2024

Kwinana HIsmelt Plants

HIsmelt pilot plant 1991-1999
100,000 tpy, $100m Capex

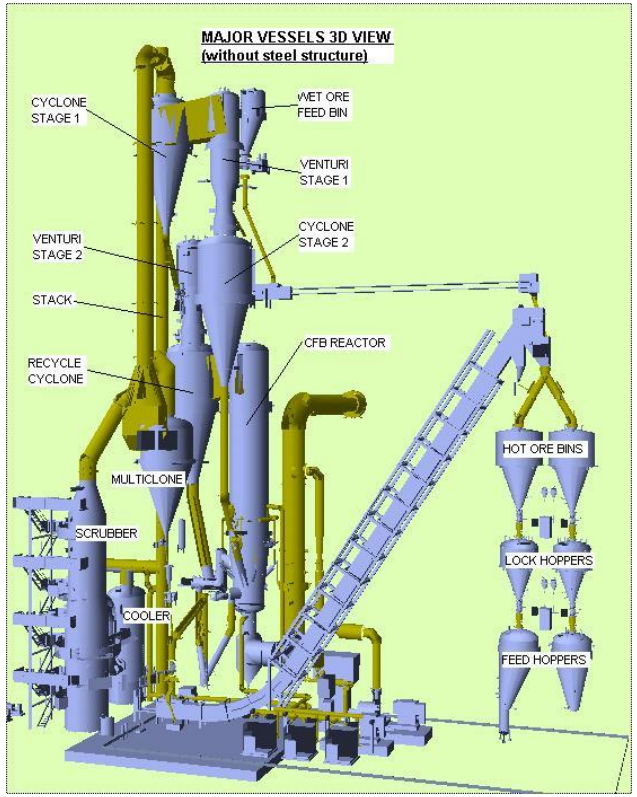
HIsmelt commercial plant
under construction 2003

HIsmelt commercial plant 2005-2008
800,000 tpy, $250m Capex

HIsmelt 1.0 – Kwinana and Yangkou

- Iron ore fines preheated to 800C (using natural gas in Kwinana, HIsmelt offgas in China)
- Iron ore fines and coal co-injected into molten metal bath
- Continuous underflow of liquid iron, batch tapping of slag
- Design production 80 tonnes per hour (600,000 tpy) using hematite @ 800kg/t of coal
- Steam raised from offgas sensible and chemical heat to generate power

Iron Ore Preheaters



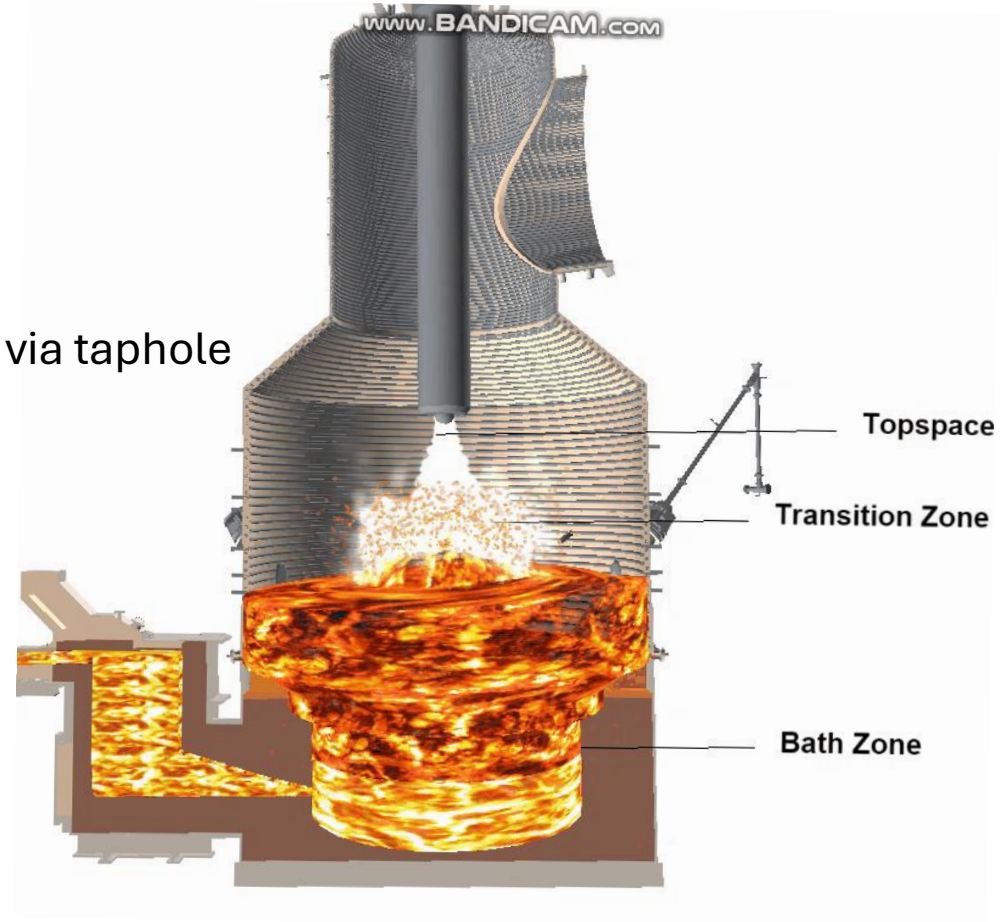
Natural gas fired fluid bed - Kwinana

SRV offgas fired rotary kilns - Molong

Smelt Reduction Vessel (SRV)

Slag batch tapped via taphole

Continuous flow of hot metal from base of the SRV via the forehearth



Post combustion of CO and H2 in the top space using hot blast @ 1200C, 40% O2)

Heat transferred from top space to metal bath in transition zone

Iron ore fines and granular coal injected into the molten metal bath

HIsmelt 1.0 – Kwinana Results

- Early problems with fluidized ore preheater overcome after major upgrades from 2005 to 2008
- Design production rate of 80 t/h achieved in 2008
- Approximately 400,000 tonnes of hot metal produced and cast into pigs
- Successfully used in EAFs worldwide including USA
- Plant closed in December 2008 due to financial crisis

HIsmelt 1.0 – Molong

- Kwinana equipment purchased by Molong in 2012, shipped to Yangkou, China in 2014, with start-up in 2016
- Design production rate of 80 t/h achieved after start-up
- More than 2,000,000 tonnes of hot metal produced with 90% of production used in Molong BOFs for OCTG steel, 10% cast into high purity pigs for foundries
- Plant closed from 2022 to 2024 due to Covid and Chinese steel pipe market conditions

Molong HIsmelt Plant at Yangkou

HIsmelt 2.0 – Luli

- Yangkou plant and HIsmelt technology purchased by the Luli Group in 2024
- Upgrades made to ancillary systems including:
  - Longer offgas duct and hood with steeper angle to reduce slag build-up, increase steam production
  - Dry gas cleaning to reduce water and natural gas consumption
  - Ore injection, stoves and oxygen plants' capacity increases

HIsmelt 1.0 v. 2.0 Results

- Monthly production increased from 57,000 to 66,000 tonnes
- Coal consumption reduced from 850 to 710 kg/thm
- Natural gas consumption reduced from 31 to 3 Nm^3/thm
- Water consumption reduced from 2 to zero m^3/thm
- Power import of 82 kWh/thm reduced to 48 kWh/thm export
- Operating cost decreased from +$20/t to -$15/t versus Chinese blast furnace cost

- Ref: HIsmelt process technology innovation and index breakthrough, Wang Zhenhua, Luli Group, China Foundry Association Conference, November 2025

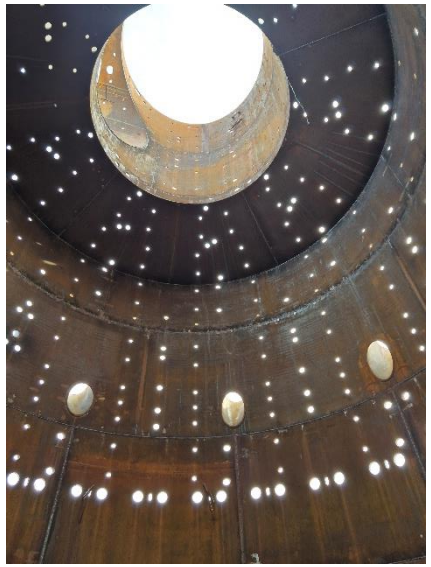
HIsmelt 2.0 Expansion

- Three new HIsmelt 2.0 plants ordered by Xingtai Steel, Hebei
- Each HIsmelt plant will feed 600,000 tpy of hot metal into an EAF to produce 900,000 tpy of steel
- Total steel plant production 2.7m tpy of hot strip via CSP
- 30% reduction in CO2 emissions compared to BF/BOF route
- Construction started in 2025 with start-up scheduled in 2026

Xingtai Hlsmelt Plants' Status 2025

No1 and No2 SRV's

No1 SRV



No1 SRV inside

Dry gas cleaning plant

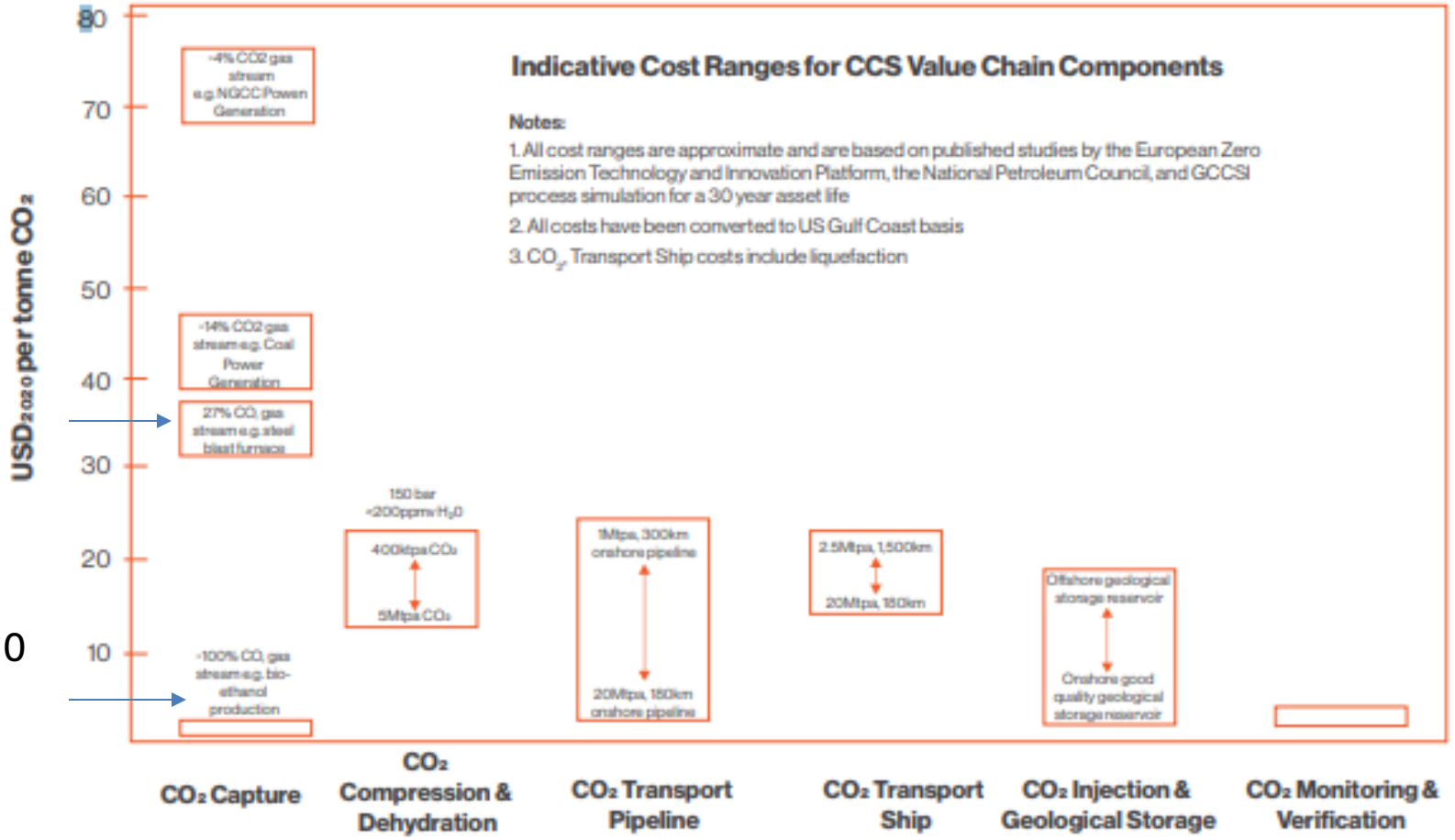
HIsmelt 3.0 Development

- Luli is developing a larger SRV capable of producing 250 tph (2m tpy) of hot metal
- Hot air blast (1200C @ 40% O2) will be replaced by 100% oxygen
- 100% oxygen will increase CV of offgas and support pre-reduction of iron ore via a fluid bed
- CO2 in offgas will be 100% allowing CCS via compression only
- Development started in 2025 with start-up scheduled in 2028

HIsmelt 3.0 with CCS

Blast furnace CCS cost point

HIsmelt 3.0 CCS cost point



Ref: IEA Iron and Steel Technology Roadmap 2020

HIsmelt Technology Summary

- HIsmelt 2.0 now producing up to 800,000 tpy of hot metal for lower cost than blast furnaces in China
- More than 3m tonnes of HIsmelt hot metal produced to date
- HIsmelt 2.0 plants will be coupled with EAFs to produce steel with 30% lower CO2 emissions than the BF/BOF route
- HIsmelt 3.0 under development which will produce 2m tpy of low-cost iron with the opportunity of zero CO2 emission via low-cost, compression-only CCS