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# Electric Smelting Furnace Technology for Green Steelmaking

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The steelmaking industry is beginning to transition from carbon-intensive blast furnace production to new, lower-emission process routes. Implementation-ready solutions are needed to support this transition, but it is crucial that the industry makes careful investments to avoid risks to production.

The use of a direct reduction plant (DRP) with a downstream electric smelting (melting) furnace (ESF, or EMF) has been a topic of significant discussion in recent years, as a potential solution to the challenge facing steelmakers, especially when blast furnace grade iron ore is the desired feed material. Electric smelting furnace technology can be applied to various flowsheets, including integrated plants with BOF or EAF steelmaking, and non-integrated (off-shore) pig-iron production. This flexibility provides cost-effective options to shift to green steelmaking by continuing to use existing facilities and pellet supply chains, as well as providing higher yields and reduced lifecycle costs, while maintaining high-value steel products.

Although ESF equipment has been proven through decades of ferrous and non-ferrous commercial installations, the scale of ironmaking envisioned for the steelmaking industry is not yet proven. However, extensive optimization and technology improvements have been completed and demonstrated at the required scale in other industries, such as ferronickel. These benchmarks form the foundation of Hatch's ESF (EMF) technology. In addition, many have been planning and implementing extensive test programs, from small to larger scales, to help better characterize the DRP-ESF (EMF) operation. These test programs will further improve the extensive knowledge available, and also help bring more widespread acceptance of this solution for steelmakers. This combined approach will help to ensure future operations ramp up to nameplate capacity quickly and provide long-term performance that is robust, reliable, and efficient.

**Primary author:** CHOMYN, Kyle (Hatch Ltd)

**Co-authors:** KOEHLER, Terrence (Hatch Ltd.); WALKER, Christopher (Hatch Ltd.); RUDGE, David (Hatch Ltd); GE, Sa (Hatch Ltd.)

**Presenter:** CHOMYN, Kyle (Hatch Ltd)

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