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Energy-Optimized, Emissions-Reducing Technologies for EAF Steelmaking

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Linde's CoJet® gas-injection technology, introduced in 1996 and now installed in over 175 EAFs, has become the industry standard for chemical energy input. To further decarbonize EAF operations and improve process efficiency, Linde has developed three hydrogen-ready systems: the 3-in-1 Injector, the Fluidic Burner, and the OPTIVIEW® flue-gas monitoring system.

OPTIVIEW® provides continuous, image-based flue-gas analysis, enabling real-time post-combustion control and reduced energy losses. The 3-in-1 Injector integrates oxygen lancing, carbon injection, and burner mode in a single sidewall unit. Its supersonic oxygen jet fluidizes and accelerates carbon for highly efficient delivery to the bath and slag–steel interface, improving slag foaming, refining, and carbon-use efficiency. It also enables injection of DRI fines or lime, supporting the industry shift toward DRI-based, low-carbon ironmaking. The Fluidic Burner uses fluidic oscillation to dynamically move the flame and melt more scrap, especially near the slag door or EBT.

As part of the GreenHeatEAF Consortium, Linde played a key role in on-site trials at SWERIM. The trials demonstrated that Linde CoJet burners can achieve good results with hydrogen as fuel compared to natural gas, even with different feedstocks such as DRI, scrap, or similar materials.

This paper summarizes these technologies and their demonstrated performance in enabling lower-carbon, hydrogen-ready EAF steelmaking.

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