

GE Vernova's Power Conversion business is helping steel producers meet both the challenge of decarbonization and grid stability

- Power Conversion—a GE Vernova business—has developed [Direct Feed](#), an advanced solution directly connected to the grid to help steel producers optimize their OPEX, while delivering ultimate grid power quality.
- With more than 120 years of expertise in the manufacturing of power electronics solutions, GE Vernova is a partner of choice for the co-development of H₂ electrolysis systems.

Steel production is a CO₂ and energy-intensive activity, which represents 7% of the global energy sector CO₂ emissions ⁽¹⁾. While global demand for steel is projected to increase by more than a third through to 2050 ⁽¹⁾, steel producers are committed to reducing the impact of their operations. There are several ways, relying on new technologies, to decarbonize the steel industry and more and more producers are considering transitioning from conventional steelmaking to Direct Reduced Iron (DRI) associated with arc furnace process, which generates 35–40% lower GHG emissions ⁽²⁾. Looking at the future, many of the world's biggest steelmakers plan to transition DRI facilities to use more hydrogen in the mix or build new DRI plants that run almost entirely on green hydrogen.

GE Vernova's Power Conversion business is able to address those challenges faced today by the steelmakers with its extensive portfolio of power electronics.

Direct Feed, a solution directly connected to the grid

The global installed base of Electrical Arc Furnaces (EAF) is expected to expand by three in the coming decades to meet the steel production processes shift. More plants and higher power demands are causing an increased stress on the grid, which stability is already at risk with the rising use of renewable energies. Consequently, grid operators are imposing higher power quality constraints to industrial companies, which must drastically reduce the electrical pollution like

flicker or harmonics rejection. Traditional compensation solutions like Static VAR Compensator (SVC) or Dynamic Static VAR Compensators (DSVC) previously selected to match required power quality performance will not be sufficient in the future, even less for extra-large furnaces.

GE Vernova's Power Conversion business has developed Direct Feed, an advanced power supply solution, to address this growing challenge. Directly connected to the grid, it allows precise management of the furnace electrode current. The digital control system enables a qualitative monitoring of the electrical arc and prevent disturbances. With the Direct Feed converter system, based on Power Conversion's Modular Multilevel technology, GE Vernova offers an integrated solution ranging from the converter itself to the EAF control and regulations systems, offering improved process performance, reduced maintenance and enhanced grid performance ⁽³⁾.

Major steel companies have already selected Power Conversion's Direct Feed system to support delivery of their decarbonization program objectives to achieve greater operational efficiencies and cost reductions.

A partner of choice for the co-development of H₂ electrolysis systems

With decades of expertise in power electronics solutions, Power Conversion works in collaboration with electrolysis solution providers, to support steel manufacturers on their path to decarbonization with the introduction of green H₂ into the DRI-based steelmaking processes.

Power Conversion has a well-established product line for a range of electrolysis applications in mining, chemical, and metals industry. These power supply solutions are integrated into systems that align with the modular electrolyzers. Products such as rectifiers, transformers, switchgear, STATCOM, controls, Energy Management Systems (EMS) and Variable Frequency Drive (VFD)-motors are also integrated into modular systems to satisfy hydrogen facility specifications.

Whether the green hydrogen is generated through Alkaline electrolyzers, Proton Exchange Membrane (PEM) electrolyzers or using Solid Oxide Electrolysis Cell

(SOEC) technology based on high temperature electrolysis process, Power Conversion has the right technical solution to help producers improve the efficiency of their processes while reducing costs, thanks to the flexibility of its high-current rectifier systems. AC-DC converter topologies, either thyristor or IGBT-based, are specifically configured to address industrial needs and grid constraints, in order to interact efficiently with the power supply and deliver a controlled DC current to manage the hydrogen flow rate.

Philippe Piron, CEO of GE Vernova’s Grid Solutions and Power Conversion businesses, explains: “Our mission at GE Vernova is to help electrify and decarbonize energy-intense processes. It is especially crucial for the steel industry which is a significant contributor to global carbon emissions. By transitioning to innovative technologies like the Direct Feed system and injecting more hydrogen into their processes, the metal producers can substantially reduce the industry’s environmental impact and pave the way for a greener and more resilient economy. We are excited to be partnering with key industrials in this area and support them on this journey with our proven technology.”

Power Conversion is attending METEC in Düsseldorf, Germany from 12 to 16 June 2023 - Booth E73, Hall 1

(1) Source: IEA - Iron and Steel Technology Roadmap

(2) Source: Berg- Huettenmaenn. Monatsh. 2020, DOI: 10.1007/s00501-020-00975-2

(3) Compared to STATCOM system

About Power Conversion, a GE Vernova business

Power Conversion, part of GE Vernova, applies the science and systems of power conversion to help drive the electric transformation of the world’s energy infrastructure. Designing and delivering advanced motor, drive and control



technologies that help improve the efficiency and decarbonization of energy-intensive processes and systems, helping to accelerate the energy transition across marine, energy and industrial applications. Power Conversion is at the heart of electrifying tomorrow's energy. www.gepowerconversion.com

About GE

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