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Next Generation Power Supply Options for Electric Arc Furnaces and Electric Smelting Furnaces

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Utilities globally are shifting towards stricter power quality requirements. This is largely motivated by increasing number of Inverter Based Resources (IBRs) such as, wind turbine and solar panel connected to utility grids and the outlook of the utility generation mix driven by the decarbonization initiatives. Electrical Arc Furnaces (EAFs) for scrap steel making are some of the most electrically volatile utility loads, producing some of the worst power quality conditions. Electric Smelting Furnaces (ESFs) are less electrically volatile than EAFs but can still produce some power quality concerns. The combination of these furnace loads and stricter power quality requirements from the utilities are motivating new technologies to the market, in applications where traditional Static Var Compensation (SVCs) or STATCOMs may not sufficiently compensate furnace loads and meet utility requirements. This paper looks at various prevalent and existing furnace power supplies as well as new and upcoming technologies for furnace power supplies, that specifically aim to connect in series with a furnace load and help clean-up the unstable characteristics of various types of furnace loads. These power supply options have the potential to make it easier for companies to comply with utility requirements when installing new furnaces or retrofitting existing furnaces. This paper also assesses other potential benefits these power supplies can bring to furnace operations.

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