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the future of forging

Sustainability in Forging

Decarbonising the forging industry using thermal energy storage-based waste heat recovery technology

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Abstract

The foundation industries underpin many aspects of our economy and are also among the most challenging sectors to decarbonise in a sustainable manner. The EU has set an ambitious target of a 42 % reduction in industrial sector carbon emissions by 2030. As per an EU estimate, the industrial sector accounts for 27 % of the overall energy consumption and the generation of 30 % of heat-related CO2 emissions. Industrial thermal processes account for 70 % of the energy demand, which is equivalent to 18.9% of the total EU energy demand. Thermal processes emit a large amount of waste heat with almost one-fifth (~400 TWh/yr.) being classified as high-grade, hence with good potential for recovery and reuse. Waste heat recovery (WHR) is thus one of the next frontiers for decarbonising energy-intensive industries.

However, batch operation processes, such as forging furnaces and die ovens, often present challenges to the WHR due to both spatial and temporary mismatches between waste heat supply and heat end use. Such mismatch challenge is further exacerbated by the grade of the waste heat. Thermal energy storage (TES) provides a solution to such challenges.

This presentation focuses on the TES based WHR technology for decarbonising forging furnaces, covering the following aspects:

- Brief introduction to the TES technologies, particularly those applicable to forging operations
- A case study on the feasibility of using the TES technology in a large forging furnace of Somers Forge
- Analyses of energy and carbon savings and economic benefits