

<https://doi.org/10.7250/CONNECT.2023.125>

ASSESSING THE GLOBAL SUSTAINABILITY IMPACT OF IMPROVING THE SECONDARY STEEL PRODUCTION: LESSONS LEARNED FROM AN ITALIAN STEEL PLANT

Giuseppe TOMASONI^{1*}, Filippo MARCIANO², Elena STEFANA³, Paola COCCA⁴

^{1,2,4} *University of Brescia, Department of Mechanical and Industrial Engineering, Via Branze 38 – 25123 Brescia, Italy*

³ *Sapienza University of Rome, Department of Mechanical and Aerospace Engineering, Via Eudossiana 18 – 00184 Rome, Italy*

* **Corresponding author.** E-mail address: giuseppe.tomasoni@unibs.it

Abstract – This study presents a comprehensive sustainability assessment of a series of technical interventions aimed at improving a secondary steel production process using the Electric Arc Furnace (EAF) technology in a steel plant located in northern Italy. The assessment covers the environmental, social, and economic dimensions of sustainability by considering three sets of indicators and employing a multi-criteria decision-making approach. The results show that the considered interventions can lead to significant improvements in the sustainability performance of the EAF process. The study also highlights the trade-offs and synergies among the sustainability dimensions and provides recommendations for decision-makers to promote sustainable practices in the steel industry. Overall, this study underscores the importance of addressing the sustainability challenges faced by energy-intensive industries such as steel production.

Keywords – *Electric Arc Furnace; life cycle sustainability assessment; multi-criteria decision-making; steel production*