



CHALLENGES – STEEL AND METAL INDUSTRY

The steel industry, as well as most other metal industries, are parts of a circular economy. However, this means that the value of end-products is degraded to raw material level. There is today a renewed interest to find solutions on how to make this loop smaller, e.g. by repair and retrofit of components or second use of end products, and by that retain and use more of the value created in the original product. This could potentially and significantly reduce the use of natural resources and energy but is also connected to big challenges regarding design, logistics, business models, etc.

The urgency to respond to global climate changes has put Europe in a position where it is possible to take the lead in development of new environmentally friendly processes for “green steel” production. The global steel value chain, mainly through the conversion of ore to iron metal, is responsible for some 8-10% of the total CO₂ emissions to the atmosphere. As such a substantial part of the global heating issue. Other metal industries also have a high impact on the global warming.

The quality of the final products from a steel mill is measured very exactly by QA/QC systems but depends on a very large number of parameters through the manufacturing process. Historically, this complex process has developed from very skilled manual operators to more and more automatic systems, thus ensuring a higher and more consistent quality level. Due to the complexity and the large number of parameters, Artificial Intelligence-based systems are becoming available and used for a better and more accurate control and optimization of process steps.

Already today, the metals and metalworking industries use a lot of photonics-based equipment and systems for different critical applications. E.g. for automation and control purposes, safety and security, surveillance and monitoring, QA/QC, R&D, materials analysis. Many sensors, gauges, actuators, and instruments are used to measure and monitor the manufacturing processes. For





analysis, sorting and logistic purposes for the circular economy, photonics systems should have a growing role.

The connection between photonics and the main challenges for the steel industry is clear. Photonics based solutions have great opportunities to contribute to existing and future demands, specially in the areas of automation, robotics, digitalisation, AI and research.

The potential for photonics-based SME's with possible solutions within the rapidly developing efforts to solve the steel industry's challenges in new or developing environmentally friendly processes, automation, digitalization or over-all efficiency is great!

