

Executive Summary

Water and Steel Report



THE BACKGROUND OF THE WATER AND STEEL REPORT

This report was published in June 2013 and was elaborated in collaboration with European Steel Technology Platform.

Water is used in every plant of a steel mill and for practically all the functions of water in industry.

A simple statement about how much water is used would seem to fit logically, but the question is not as simple as it sounds. Indeed, different steel mills use hugely different quantities of water, depending on access to water, mostly determined by geography, and by local regulations.

The amount of water used in the industry can be split according to consumption/input, discharge/output and thus water usage is the difference between input and output; moreover, water is often reused in a closed loop inside the steel mill (recycled water) and thus individual processes can use more water than their share of the final consumption.

In spite of the tremendous importance of water in the steel sector, the way water is used is not standardized as are the steel production processes and there is no “one size fits all” strategy or technology to use water in each particular context. Of course, each individual steel mill has a much deeper knowledge of its own water uses and has usually to report them to national regulatory agencies to demonstrate compliance with regulations and with the permit to operate of the plant.

MAIN TARGET OF THIS REPORT

The present document participates to the effort made by both the steel and water industries to develop innovation partnerships in order to continuously maintaining water management in the steel industry at the highest level. Its aim is to propose a list of RTDI issues, six in all, that have been considered critical by both industries: they constitute a set of problems in search of solutions, thus are similar to the calls for research that the Commission issues regularly as part of its RTDI programs: they are therefore simulated or “mock” calls. It should not be considered as a foresight-oriented roadmap of water in the steel sector - as it did not aim at exhaustively - nor as a detailed presentation of the state-of-the-art regarding water in the sector, an effort which is on-going elsewhere.

It is a positive and optimistic statement about the continuous need for progress, posited as a strength and an opportunity for Europe, which has demonstrated world leadership in the two sectors of steel and water. Helping the EU launch focused RTDI work in the area should foster this common leadership in the years to come.



A Common Vision for Water Research and Innovation

CONTENT OF THE RTDI THEMES

In the European Research Area, there are several opportunities for the implementation of this research programme in the coming years. Horizon 2020 is the next European Framework program covering the period 2014-2020. "Water & industry" is one of the work packages where this document ought to be included. One should also mention the SPIRE initiative, "Sustainable Process Industry through Resource and Energy Efficiency", a proposal for a new Public Private Partnership (PPP) to be implemented within Horizon 2020. It could also be mentioned the specific RFCS program, the Research Fund for Coal and Steel, where the sustainable use of water is among the ongoing priorities for 2013.

The list below is a selection of focused issues that have the potential to lead to fruitful new RTDI within the steel industry.

- Development of Process Flow Diagram for a Steel Facility
- Application of decision-support tools for the optimal selection of current water treatment technologies
- New technology concepts for using water as an energy-transfer medium, while minimizing exergy destruction: water is used extensively to cool processes where temperature reach as high 2400°C in order to manage both their smooth, reliable and rapid, high-volume operation and to preserve the integrity of the equipment.
- Product and resource recovery from waste waters, brines and sludges: water-bearing residues in the steel mill originate from many process plants and have been properly treated in terms of safety and water quality, ready for discharge, while some mostly solid residues are left with higher concentration of ancillary elements resulting from processes
- Simultaneous optimization of energy and water flows: pinch analysis is in principle a powerful tool for optimizing either water or energy flows, although their application to a steel mill is still limited to a few published examples
- Use waste heat as a driving force for separation technology

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