THE OVERSEEN LINEAR PROCESSES IN A CIRCULAR ECONOMY

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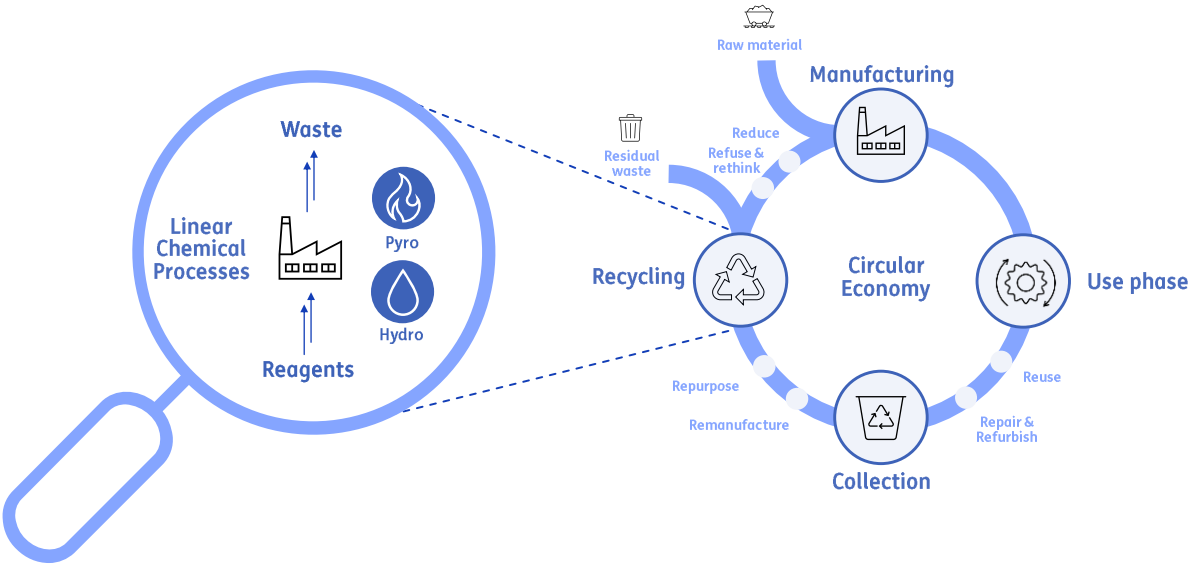
Metals play a pivotal role in constructing Europe's clean energy infrastructure, contributing to with the EU's ambitious 2050 climate-neutrality objective. As demand for these critical metals is rising fast, so does the need to explore sustainable practices for the supply. For this, recycling is expected to play an important role, as large quantities will become available in the urban mine.

Traditionally, metal recovery from renewable energy waste streams (such as batteries) rely on energy-intensive pyrometallurgical methods. Often, these processes fall short in fully reclaiming all metals. As an alternative, hydrometallurgical approaches are emerging. However, this approach most often involves harsh reaction conditions and large waste streams.



From a circular economy perspective, the current chemical recycling practices are shifting the initial material problem to a second loop: In scenarios where a material loop could be effectively closed (e.g. lithium recovery from batteries), the underlying chemical recycling processes are often linear. Therefore, also the second material loop involved in recycling processes, should be circular.

On this poster, we present the research of the TNO Circular Electronics team, which focusses on developing circular recycling processes to fully close materials loops that are essential for the energy transition. A specific focus will be on how electrification of chemical processes can be a game changer in the field of (critical raw material) recycling.