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Abstract

A considerable part of the fossil CO₂ emissions comes from the energy sector, in which the main parts are released through energy-intensive industries, namely metal production, chemicals, and manufacturing. Hence, decarbonization of industries is considerably important beside the other sectors such as net zero buildings and transformation. The main concept of this speech will cover renewable energy/resources solutions after looking into potential classic decarbonization. First objective is about the upgrading of the existing processes, equipment, and plants besides implementing the heat recovery/integration based on the innovations toward reducing the energy requirements and efficiency increments. Then, the renewable resources are going to be introduced. Moreover, energy production and conversion methods, feedstocks, carbon capture and storage, and electrification will be discussed.

Overall, both classic and innovative renewable attempts are required to reach the deep decarbonization targets. At the end, the objectives are going to be expanded toward chemical industries by introducing the potential technology implementation at different subsectors. For this purpose, the assessed roadmaps and pathways will be discussed further. The primary research results of my current study reveal that although all of the inventive suggestions are not available at an industrial scale or are not economically viable yet, they will play a crucial role in the energy transition at upcoming decades.

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