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HORIZON-CL4-2024-TWIN-TRANSITION-01-34

ALCHEMHY

Full Title: Alternative routes for basic chemicals production using hydrogen as feedstock

Aim:

ALCHEMHY aims to redefine how the chemical industry produces two of its most crucial compounds: ammonia and methanol. These substances are essential to agriculture, energy systems, and numerous industrial applications—yet their traditional production methods are highly carbon-intensive and reliant on fossil fuels. The project sets out to develop new, electrified, zero-emission technologies that drastically reduce environmental impact while maintaining industrial competitiveness. Through this transformation, ALCHEMHY will help steer the chemical sector towards a future that is not only low-carbon, but also more resilient, efficient, and aligned with Europe's broader sustainability objectives.

Concept:
The ALCHEMHY concept is grounded in the belief that true industrial sustainability requires both technological innovation and systemic change. The project addresses key sustainability challenges by targeting the full decarbonisation of ammonia and methanol production—two of the most energy- and emission-intensive chemical processes globally. It does so by introducing breakthrough technologies that leverage renewable electricity and green hydrogen, such as plasma-based catalysic hydrogenation, direct electrochemical synthesis, small flexible reactors and sorption-enhanced reactors. These are supported by advanced digital tools like digital twins and process modelling. ALCHEMHY's interdisciplinary framework brings together leading industrial players, academic experts, SMEs, and policy actors to jointly develop, test, and scale solutions. The result is a coordinated effort to push the chemical industry beyond incremental

improvements towards systemic transformation.

Start date:
01/10/2024

End date:
30/09/2027