H2STEEL, a European project that aims to support the ecological transition of the metallurgy industry

- The H2Steel project aims at supporting the decarbonization of the European steel production sector
- The project started on October 2022
- The innovative solutions proposed by the project will allow for significantly reduce the GHG emissions from steelmaking

H2STEEL is a European project which has the goal of creating a **ground-breaking competitive solution for sustainable green hydrogen and bio coal production from circular biowaste streams**. The project aims at contributing to the EU Green Hydrogen economy and to the **decarbonization of the European steel sector**, as its green transition is a priority. A **zero-emissions continent is one of the many goals set by the European Commission for a greener and more resilient Europe**, and performed through policies and initiatives like the European Green Deal, the 2030 Climate Target Plan or the 2050 long-term strategy.

H2STEEL project presents an innovative, disruptive solution to convert wet waste streams into green Hydrogen, Carbon and Critical Raw Materials. The disruptive hydrogen production, made via a biomethane catalytic cracking through a new biochar-based catalyst and reactor, is meant to open a new route for cost-competitive green H2 in Europe.

The biochar-based catalyst that **H2STEEL** proposes is produced from a by-product of anaerobic digestion (digestate), which would, otherwise, be considered as waste. This enables the **recovery of organic carbon and critical raw materials (CRM) from waste** and the production of a low cost, sustainable catalyst. Moreover, after biomethane cracking, the catalyst combined with the produced carbon can be used as bio coal, **implementing a truly circular approach**.

This material, fully biogenic-carbon based, can afterwards be used in the production of steel as a substitute of metallurgical (fossil) coke, **promoting a net Greenhouse gas emissions reduction**. This is how **H2STEEL** will **contribute to the European Union Emission Trading Scheme** (ETS), the tool that the EU is using to reduce the emissions in a cost-effective way. **All the expected benefits of the processes will be quantified by means of an LCA (Life Cycle Assessment) analysis, so** to demonstrate the sustainability of the proposed approach, from multiple perspectives.

The innovative solution proposed by **H2STEEL** represents **an unconventional step towards the application of carbon-based catalytic pyrolysis of biomethane**, where the catalyst is cost-effective – as produced from wastes –, resistant to contaminants and temperature, and ready to be used in a downstream industry (industrial symbiosis). **This can help saving the energy and cost for the regeneration step and avoiding the release of CO_2 to the atmosphere**, as it happens in the Steam Methane Reforming process or in most of the catalysts' regeneration steps.

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H2STEEL is a **Horizon EIC action, Grant Agreement nr. 101070741**, that will run for **36 months**, until September 2025, and has received funding from the **European Innovation Council**.

The consortium is formed by 6 Partners from 4 countries. **Politecnico di Torino** is the coordinator and the other Partners are: **Consorzio Per La Ricerca e La Dimostrazione Sulle Energie Rinnovabili** (Re-Cord) (Italy); **Universiteit Leiden** (The Netherlands); **Societa Per La Gestione Dell' Incubatore D'Impresa Del Politecnico SCPA** (Italy); **Contactica SL** (Spain); **Arcelormittal Maizieres Research SA** (France).

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