

STructured unconventional reactors for CO₂ -fRee Methane catalytic crackING

MISSION

STORMING aims develop to breakthrough innovative and structured reactors heated using renewable electricity, to convert renewable CH₄ into CO₂-free H₂ and highly valuable carbon nanomaterials for battery applications.

SOME FACTS

Starting date: 1st September 2022 Project duration: 36 months Budget: 3 125 714.75 Euro HORIZON-CL5-2021-D2-01-09: Methane cracking to usable hydrogen and carbon HORIZON-WIDERA-2022-ACCESS-07 (2nd cut off)

TOWARDS AN HYDROGEN ECONOMY

The STORMING project significantly advances the policy and programme objectives of the EU Green Deal, the Hydrogen Strategy, and the Hydrogen Accelerator by facilitating a swift transition to a clean hydrogen economy and bolstering Europe's leadership in green technologies.

THE PARTNERS

Highly complementary & interdisciplinary consortium









#EUGreenDeal

European Commission













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ST<u>ÇRM:NG</u>

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DECARBONISATION OF H2 PRODUCTION BY BIO(METHANE) DECOMPOSITION

STORMING objective is to develop breakthrough structured catalytic reactors powered by renewable electricity to simultaneously produce CO2-free or CO2-negative H2 and high-quality carbon nanotubes, CNTs, in a continuous technology that could be deployed in a sustainable manner.



Production of captive H_2 (on-site production) and the **capture of C from the CH**₄ **as CNTs**, an economic credit that reduces the delivered net cost of H_2 .



STRUCTURED CATALYSTS

Fe-based catalysts selective for **controlled CNTs growth**:

- non-toxic & easily available

 more active and stable at high temperature than Ni

Chemical scissor protocols (waste-free) to harvest CNTs and regenerate the catalyst.









Heat generated by passing a current through a resistive material.
Avoid wall effect and few to no thermal gradients.

- Selective **dielectric** heating of catalytic materials.
- Gas-solid temperature control لا

Selectiveheatingofelectricallyconductiveandferromagneticmaterials.

ע Fast heating, enhance heat transfer. ע



Direct heating of the catalyst -> Decrease of temperature gradients and heat losses -> Increasing heating efficiency

APPLICATION STORMING TECHNOLOGY

- Heavy transport
- Hard to abate industries
- CNTS for batteries to replace graphite



High temperature heat Combustion Steel manufacturing Brightening (DRI)







