

What is PYRAH2?

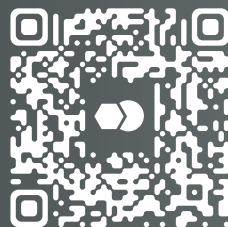
PYRAH2 is a European innovation project developing a circular route to produce **renewable hydrogen** and **solid carbon** from **biogenic waste**.

Instead of treating organic residues as a disposal challenge, PYRAH2 uses them as a **resource**. The project combines gasification, biological methanation and plasma-assisted methane pyrolysis to transform biowaste into two valuable industrial products: **hydrogen** and **solid carbon**.

This integrated pathway offers an alternative to conventional hydrogen production methods, which often depend on fossil resources or require high energy inputs. By converting carbon into a stable solid product, PYRAH2 also opens new opportunities for carbon valorisation in industrial value chains such as **tyre manufacturing** and **steel production**.

Through the construction and operation of a pilot plant, the project will demonstrate the technical, environmental and economic potential of this approach, supporting Europe's transition towards climate neutrality, circularity and greater energy resilience.

Follow the
project progress:



www.pyrah2.eu



@PYRAH2 Project



@pyrah2project.bsky.social



**PYrolytic Renewable
Approach for Hydrogen
and carbon production**



Co-funded by
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Project KPIs

Performance

- 30 kg H₂/h production capacity
- >98% hydrogen purity
- ≥ 3,000 hours of stable operation

Cost and efficiency

- <15 kWh/kg H₂ energy consumption
- ~3 €/kg H₂ (target LCOH)
- 30–50% OPEX reduction vs electrolysis

By the numbers



The four-stage process

- 1 Autothermal gasification of biogenic waste (and syngas conditioning)
- 2 Biological upgrading through biomethanation
- 3 CO₂ separation (and water removal)
- 4 Plasma-assisted methane pyrolysis, hydrogen purification, and carbon recovery



Main Feedstock:
Bio-Waste



**Autothermal
Gasification**



**Biomethane and
CO₂ Separation**



**Biomethane Pyrolysis
& H₂ Purification**



Solid Carbon
Tyre manufacturing,
steel industry



Hydrogen
Chemical, steel,
materials Industries

The impact

Up to **80%** GHG emissions reduction

>9 kg CO₂ avoided per kg of H₂

The consortium

