French SME who develops an advanced steam gasification process to refine mixed and unpredictable organic (biogenic and plastics) waste streams into Hydrogen and pure CO2 for carbon-based products is looking for R&D or demonstration partnerships

Summary

Profile type

Technology offer

Company's country

France

POD reference

TOFR20260130020

Profile status

PUBLISHED

Type of partnership

Research and development cooperation agreement

Targeted countries

- **Italy**
- **Bulgaria**
- **Estonia**
- **Greece**
- **Spain**
- **Sweden**
- **Ireland**
- **Latvia**
- **Poland**
- **Belgium**
- **Georgia**
- **Luxembourg**
- **Czechia**
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- **Germany**
- **Hungary**

- **Finland**
- **Malta**
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- **Slovenia**
- **France**

Contact Person	Term of validity	Last update
Sabrina WODRICH	**30 Jan 2026** **30 Jan 2027**	**30 Jan 2026**

General Information

Short summary

The French SME has developed a combustion free process that converts solid organic waste into renewable hydrogen and valuable carbon based products. Its controlled temperature profile ensures high hydrogen yields and tolerates wide feedstock variability, from biomass to plastics. Hydrogen is a key output, while CO_2 is captured and locked into commercial materials. Designed for small scale, decentralized use, it can produce hydrogen for about €1/kg.

Full description

The France-based company delivers scalable, sustainable solutions for decarbonizing industrial energy streams. Headquartered in Bordeaux, it operates at the intersection of chemical engineering, thermochemical process innovation, and clean hydrogen and carbon products production. Its mission is to accelerate the transition to a carbon neutral energy economy by converting waste organic feedstocks into low-emission hydrogen and valuable co-products.

The core problem addressed by the company's technology is producing hydrogen at scale and competitive cost without fossil feedstocks or large renewable electricity inputs. Hydrogen is indispensable across sectors—including refining, chemicals, steelmaking, power generation, and mobility—but dominant pathways (steam methane reforming [SMR] and coal gasification) emit significant CO_2 . Electrolytic "green" hydrogen, while zero-carbon at use, requires abundant, low-cost renewable electricity that is not always available and remains economically challenging. The gap between clean hydrogen demand and practical, scalable supply remains a critical barrier to decarbonisation.

Modern solutions include electrolytic water splitting (PEM, alkaline, solid oxide), thermochemical reforming with carbon capture, pyrolysis for co-production of solid carbon and hydrogen, and emerging biomass gasification systems. Electrolysis is proven but limited by capital cost and renewable energy availability. Carbon capture retrofits complicate SMR. Biomass gasifiers face feedstock logistics and tar management. Pyrolysis (e.g., methane pyrolysis) produces solid carbon and hydrogen but struggles with scalability, heat integration, and product separation. Gasification also faces challenges processing real-life waste streams due to quality variations.

The company's process converts diverse waste carbonaceous feedstocks, including plastics, municipal solid waste, agricultural residues, and low-value industrial by-products, into hydrogen and high-value carbon derivatives. It uses continuous, mechanically driven thermochemical processing to selectively cleave long-chain organics, producing hydrogen and a CO_2 stream convertible into tailored solid carbon. The technology is modular, flexible, and compatible with industrial heat sources or renewable thermal carriers.

Key features of the process include:
- Feedstock versatility: Ability to process heterogeneous waste streams without stringent pre-sorting, reducing upstream handling costs.
- Continuous operation: Design enables steady throughput suitable for industrial deployment and scalable manufacturing.
- Thermal efficiency: Integrated heat recovery pathways and optimized residence dynamics improve overall energy utilization compared to batch pyrolysis systems.
- Product quality: Generation of hydrogen suitable for blending or purification to industrial grades and tailored carbon solids for materials or sequestration markets.
- Lower emissions footprint: By converting waste feedstocks into fuel and materials, the process mitigates landfill disposal and bypasses fossil hydrogen emissions.

Application field extends across renewable hydrogen production for industrial energy, feedstock for fuel cells and mobility, decarbonised heat applications, and integrated circular economy value chains where waste upcycling yields new revenue streams.

Advantages and innovations

The Company's innovation lies in its combination of process design, feedstock flexibility, operational continuity, and product integration, which together differentiate it from other thermochemical hydrogen production approaches:
Broad Feedstock Tolerance with Minimal Pre-Processing:
The technology handles heterogeneous waste inputs — including mixed plastics, agricultural residues, and low value industrial carbon streams — without stringent sorting or drying. Proprietary heat transfer and energy source design accommodate variable physical and chemical properties, reducing preprocessing costs and widening usable resources.
Integrated Heat Management and Energy Recovery:

The system incorporates an energy recovery pathway capturing sensible heat from product streams and recycling it into the reactor. This significantly improves thermal efficiency over reactors reliant on external heating or subject to high heat losses, lowering auxiliary energy demand.
Tailored Product Streams:
Through precise control of temperature and residence time, the RefHynery produces hydrogen rich syngas with lower diluent formation and solid carbon with controlled morphology. This improves downstream separability and enables high quality end products — for industrial hydrogen purification or carbon material markets.
Modular Scalability and Industrial Integration:
The architecture supports modular replication, enabling horizontal scaling in industrial clusters or integration with existing heat sources (e.g., waste heat or renewable thermal carriers). This reduces capital intensity and footprint compared with large single unit reactors.
Emissions and Circularity Orientation:
The process minimizes CO_2 and other undesired by products through thermal pathway management and selective cracking. Combined with valorisation of waste streams otherwise destined for landfill or incineration, this enhances lifecycle carbon performance.

Technical specification or expertise sought

The company seeks:
- Research collaborations with academic institutions to further develop CO2 conversion and valorization processes.
- Pilot demonstration partnerships with industrial host sites to integrate the technology with real waste streams and end-use hydrogen / CO2 conversion applications.
- Strategic industry alliances to align technology outputs (e.g., hydrogen quality, carbon products) with market requirements in refining, chemicals, and material sectors. These alliances support early off-take agreements and co-development of tailored solutions.

Collectively, these cooperation types enable the company to advance its technology from proof-of-concept toward

Stage of development

Available for demonstration

Sustainable Development goals

- **Goal 13: Climate Action**
- **Goal 7: Affordable and Clean Energy**
- **Goal 17: Partnerships to achieve the Goal**
- **Goal 9: Industry, Innovation and Infrastructure**
- **Goal 3: Good Health and Well-being**
- **Goal 11: Sustainable Cities and Communities**
- **Goal 8: Decent Work and Economic Growth**
- **Goal 12: Responsible Consumption and Production**

IPR Status

IPR granted

IPR Notes

IPR Notes

Partner Sought

Expected role of the partner

- Deploy a pilot unit to provide a decarbonized stream of pure hydrogen and CO2 for downstream utilization programmes (clean mobility, carbon-based products development, communities sustainable ecosystems)
- Provide a pilot unit to demonstrate productive uses of various hard-to-abate organic waste streams
- Provide an industrialization platform to commercialize CO2 conversion solutions into products

Type of partnership

Research and development cooperation agreement

Type and size of the partner

- **SME <=10**
- **SME 50 - 249**
- **SME 11-49**
- **R&D Institution**
- **Big company**
- **University**
- **Other**

Dissemination

Technology keywords

- **04005012 - Waste to energy - other**
- **04009 - Carbon capture and energy**
- **04005010 - Integrated waste-energy processes**

Market keywords

- **06007001 - Other energy production**
- **08001017 - Industrial chemicals**
- **06002003 - Power grid and distribution**
- **06003008 - Other alternative energy**

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Sector groups involved

- **Renewable Energy**
- **Energy-Intensive Industries**
- **Energy-Intensive Industries - BioChemTech**
- **Energy-Intensive Industries - Materials**