A Spanish company offers modular bioethanol reforming system for decentralized hydrogen production

Summary

Profile type	Company's country	POD reference
Technology offer	**Spain**	**TOES20250709027**
Profile status	**Type of partnership**	**Targeted countries**
PUBLISHED	**Research and development cooperation agreement**	**• World**
Contact Person	**Term of validity**	**Last update**
Enrico FRANZIN	**9 Jul 2025** **9 Jul 2026**	**9 Jul 2025**

General Information

Short summary

A Spanish company specialized in renewable energy (hardware developer) offers a modular innovative technology for decentralized hydrogen production via catalytic reforming of renewable bioethanol.
The system enables on-demand generation of high-purity hydrogen for industrial, autonomous, and off-grid applications. Its advantages include renewable operation, high efficiency, and scalability.

The company seeks both commercial partners and R&D collaborators.

Full description

This modular hydrogen generation system has been developed in Spain by a technology-driven company with extensive experience in clean energy, hydrogen technologies, and decentralized power systems. The organization has participated in national and international R&D initiatives focused on energy transition, and brings proven expertise in the development of autonomous, scalable energy modules adapted to real-world operational environments.

The system addresses a key limitation of current hydrogen infrastructures: the difficulty of deploying clean hydrogen generation capabilities in remote, off-grid, or space-constrained settings. Most existing solutions rely on large-scale centralized production or compressed gas logistics, which involve significant costs, safety risks, and lack of flexibility

for distributed applications.

To overcome these challenges, the technology integrates a complete hydrogen reforming pathway into a compact, all-electric platform. It performs catalytic steam reforming of bioethanol, followed by water-gas shift (WGS) conversion to optimize hydrogen yield, and final purification via pressure swing adsorption (PSA). The unit is designed for autonomous operation, supporting variable input profiles and optimized for start-stop cycles, making it ideal for hybridization with intermittent renewable sources. The system is suitable for a wide range of applications: industrial decarbonization, emergency power supply, mobile recharging stations and off-grid infrastructure.

Technical features include modular architecture, electric heating, embedded control systems, and safety protocols for hydrogen detection and automatic purging. Bioethanol serves as a renewable, liquid hydrogen carrier that simplifies transport and storage compared to compressed H_2, while enabling rapid deployment and flexible logistics.

This company seeks research and development cooperation agreements and technical collaborations with partners interested in adapting, validating or integrating our Bioethanol Reforming system in real use cases.

Advantages and innovations

This hydrogen generation system is a modular unit based on catalytic steam reforming of renewable bioethanol, designed for on-demand, autonomous operation in isolated or infrastructure-limited environments. The complete process includes pre-heating, catalytic reforming, water-gas shift (WGS) reaction, and purification via Pressure Swing Adsorption (PSA), producing hydrogen suitable for PEM fuel cells.
Technical specifications:
– Hydrogen output: up to 15 kg/day per unit
– Hydrogen purity: >99% (meets fuel cell requirements)
– Operating temperature: 700–800 °C in the reformer core
– Pressure range: 1–200 bar (including compression stages)
– Fuel: bioethanol (>95%), non-toxic, ambient storage
– Power supply: fully electric, suitable for coupling with PV or hybrid sources
– Thermal management: resistive electric heating, no combustion gases
– Catalyst: Ni-based, with options for in-situ regeneration
– Purification media: activated carbon, silica gel and zeolite 5A in PSA stage
– Start-up time: <15 minutes
The system is currently at TRL6, with a functional prototype available and tested under simulated operational conditions.
Expertise sought:
Partners should have experience in one or more of the following areas to support technical collaboration:
– Integration of hydrogen production units into sector-specific infrastructures, such as agro-industry, public buildings, or transport applications (or any other).
– Design and execution of pilot projects, with capacity to host field trials and monitor performance under operational conditions.
– Adaptation of installation formats, including thermal interface design, electrical integration with local power sources, or physical layout optimisation.
– Technical dissemination and reporting in the context of demonstration projects, and contribution to the preparation of joint R&D proposals.
Technical partners should have hands-on expertise in hydrogen system integration, thermal system design, or process control.

Technical specification or expertise sought

Stage of development

Available for demonstration

Sustainable Development goals

- **Goal 8: Decent Work and Economic Growth**
- **Goal 13: Climate Action**
- **Goal 11: Sustainable Cities and Communities**
- **Goal 9: Industry, Innovation and Infrastructure**
- **Goal 7: Affordable and Clean Energy**
- **Goal 12: Responsible Consumption and Production**

IPR Status

Secret know-how

IPR Notes

Partner Sought

Expected role of the partner

Type of partner: The partner sought is a research organisation, applied R&D institute, engineering consultancy or innovation-driven company with capabilities in hydrogen technologies, process integration or clean energy systems. Entities active in pilot deployment, industrial decarbonisation, or autonomous energy infrastructures are of particular interest. Previous experience in publicly funded technical projects (e.g. Horizon Europe, Innovation Fund) will be considered an asset.

Role of the partner: The partner is expected to support the technical integration, validation and refinement of the reforming system under realistic or application-specific conditions. A key aspect of the collaboration is the co-development of use cases and adaptation of the system architecture to diverse deployment contexts.

Specifically, the partner is expected to:
– Identify suitable application scenarios for integration (off-grid facilities, agro-industrial operations, mobile recharging units, hydrogen hubs).
– Design and execute pilot installations adapted to real thermal/electrical loads, available infrastructure and environmental constraints.
– Adapt and evaluate peripheral subsystems such as preheating loops, heat exchangers, control electronics or thermal insulation solutions.
– Provide technical feedback to improve system usability, robustness and replicability in sector-specific deployments.
– Support the preparation or execution of national or EU-funded R&D or demonstration projects involving hydrogen generation and use.

The objective of the partnership is to jointly validate, optimise and contextualise the modular reforming technology for effective adoption in decentralised, autonomous or industrial energy application

Type of partnership

Research and development cooperation agreement

Type and size of the partner

- **Big company**
- **SME 50 - 249**
- **R&D Institution**
- **Other**
- **University**

Dissemination

Technology keywords

- **04002012 - Other energy related machinery**
- **04002002 - Hydrogen production**
- **04005003 - Liquid biofuels**

Market keywords

- **06003008 - Other alternative energy**
- **06007001 - Other energy production**

Targeted countries

- **World**

Sector groups involved