



New Ventures
RESEARCH & INNOVATION

Press release

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ENGIE New Ventures invests in MAGNOTHERM, a start-up specialising in hydrogen liquefaction

ENGIE New Ventures (ENV), ENGIE's Research and Innovation investment fund for innovative start-ups that accelerate the energy transition, has invested in MAGNOTHERM.

This German start-up was created in 2019 in Darmstadt. It is developing a hydrogen liquefaction process based on magnetic refrigeration and has raised €6.8 million this year.

MAGNOTHERM's disruptive technology, which can also be used for cold production (refrigerators, air conditioners), uses magnetic refrigeration to liquefy hydrogen, allowing it to be transported and stored in larger quantities. The process is based on the magnetocaloric effect (MCE), which changes the temperature of a magnetic material exposed to an external magnetic field.

MAGNOTHERM's hydrogen liquefaction technology is currently in the development phase. With this investment, ENGIE aims to play an active development role by drawing on the knowledge and expertise of the Lab CRIGEN, ENGIE's R&D centre for green gases (hydrogen, biogas, liquefied gases). ENGIE and MAGNOTHERM are also members of a European consortium as part of the EU-funded HyLICAL project, which aims to build Europe's first magnetic liquefactor of hydrogen.

MAGNOTHERM's technology will cut hydrogen liquefaction costs, making it economically viable. This paves the way for the emergence of a hydrogen transport supply chain for the development of the entire hydrogen sector. This ambition falls under ENGIE's broader strategy of leading the energy transition with a strong decarbonisation policy, and of achieving carbon neutrality by 2045.

"ENGIE New Ventures' investment in MAGNOTHERM is an important step for ENGIE in developing a renewable hydrogen supply chain ecosystem that aims to produce, liquefy, and transport this hydrogen throughout Europe. Their technology could constitute a breakthrough innovation for hydrogen liquefaction, and ENGIE will support its development for future industrialisation via its Research Centre," said Valérie Ruiz Domingo, ENGIE's Group Vice-President for Hydrogen.



"We are very happy about the valuable support from one of the world's largest energy companies! Now, hopefully, we will be able to answer the question of how we can transport green hydrogen to or within Europe and use it more quickly much faster!" adds Timur Sirman, Co-CEO of MAGNOTHERM.

ENGIE and MAGNOTHERM are convinced: The green transformation requires not only green hydrogen, but also the associated infrastructure for safe and efficient transport. Industries such as aviation, shipping and other heavy-duty applications might benefit massively from hydrogen liquefaction based on magnetocaloric cooling technology and reach net zero faster. MAGNOTHERM's goal is to offer a solution that is scalable for industrial scale. The Construction of a plant for the liquefaction of hydrogen and suitable for this purpose, is planned to take place as early as 2025.

This joint effort should help to meet the coming industrial needs in a more resilient way: Several studies¹ predict that by 2030, when the first magnetocaloric hydrogen liquefier will be at the industrial scale, the total demand for hydrogen amounts to 40 - 90 terawatt hours per year - corresponding to an electrolysis capacity of 22 to 37 gigawatts,² which compares to around eighty times the currently installed global electrolysis capacity.

About ENGIE New Ventures

ENGIE New Ventures (ENV) is the investment fund at ENGIE Research & Innovation, dedicated to innovative start-ups in the field of climate technologies. ENV makes minority investments in innovative start-ups, bringing strategic value to the Group, with a focus on future disruptive technologies. Since 2014, investments have been made in more than 50 solutions in the cleantech sector. Its investments are directed in particular at renewable energies, energy efficiency and flexibility solutions, and green gases including hydrogen. ENV's offices are represented in Paris, San Francisco, and Tel Aviv. For more information: www.engieventures.com

¹ Wietschel, M. et al., 2023: Price-elastic hydrogen demand in Germany - methodology and results. HYPAT Working Paper 01/2023. In: Global H2 Potential Atlas. Sustainable locations in the world for tomorrow's green hydrogen economy: Technical, economic and social analyses for the development of a sustainable global hydrogen atlas, via https://www.hypat.de/hypat-wAssets/docs/new/publikationen/HyPAT_Working-Paper-01_2023_Preiselastische-Nachfrage.pdf

² To put this into perspective: 20 GW is around forty times the currently installed global electrolysis capacity; according to the US-Office of Energy Efficiency & Renewable Energy, 1 GW is the amount of energy needed to power 100 Million LED Bulbs (<https://www.energy.gov/eere/articles/how-much-power-1-gigawatt> | retrieved 26.09.2023). In 2022, the installed wind power capacity throughout Europe was 255 GW (<https://windeurope.org/intelligence-platform/product/wind-energy-in-europe-2022-statistics-and-the-outlook-for-2023-2027/>)



About MAGNOTHERM

MAGNOTHERM is a start-up created at the Technische Universität Darmstadt in 2019. It develops and builds highly efficient, durable cooling solutions based on magnetic materials. Instead of gas-based refrigerants, this new magnetic cooling technology uses the MCE of iron-based alloys. The majority of the international team consists of scientists from the fields of materials science, physics, and engineering. MAGNOTHERM is seeking to revolutionise the cooling industry with a view to making it sustainable. Find out more: www.magnotherm.com

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