

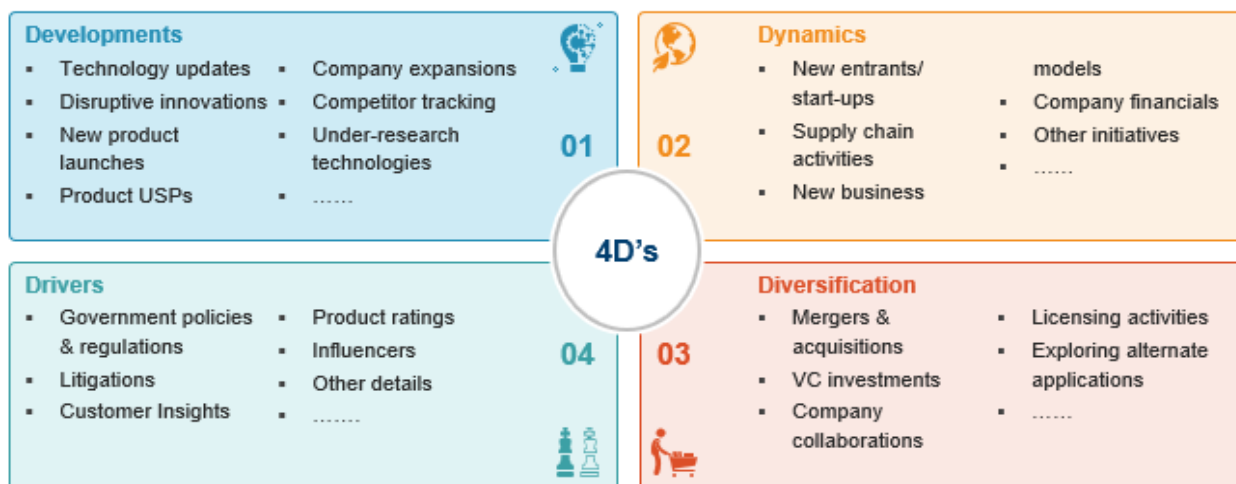
INTELLOTRACKER

Hydrogen Storage

April 2023












ARANCA'S QUARTERLY SECTORIAL UPDATE ACROSS FOUR DIMENSIONS....






DEVELOPMENTS

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| New Manufacturing Set-Ups |  | RWE submitted a proposal for constructing a hydrogen storage facility in Epe, Granau, Germany. The hydrogen storage facility will be a cavern storage facility expected to be built by 2026. Source: Company Website |
| New Manufacturing Set-Ups |  | Gravitricity plans to develop a first full-scale demonstration of its underground hydrogen storage solution with VSL Systems UK. Source: PV Magazine |
| New Manufacturing Set-Ups |  | EnerVenue plans to open a gigafactory in the USA to produce metal-hydrogen batteries. Source: Power Technology |
| New Product Launch |  | DSM launched two new grades of liner materials for Type IV pressure vessels for hydrogen storage. Source: Plastics Today |
| Technology / Innovations |  | The technology describes a process for producing a material for hydrogen storage comprising separate layers of hydrogen-storing material, such as magnesium or magnesium alloy with a graphene additive, and a heat-conducting material, such as graphene, press molded into a sandwich structure. Source: Patent |
| Technology / Innovations |  | The technology describes a hydrogen storage device comprising of a vessel with a fluid inlet and a fluid outlet, with a thermally conducting network thermally coupled with a heater. The vessel can receive a hydrogen storage material, such as a liquid organic hydrogen carrier, in thermal contact with the thermally conducting network. Source: Patent |
| Technology / Innovations |  | The technology describes an alloy mixed powder material that stores hydrogen by absorbing it. Source: Patent |
| Technology / Innovations |  | The technology describes a high-pressure composite metal-hydride hydrogen storage tank; comprising a base bracket, a hydrogen storage tank shell with an inlet and an outlet, a hydrogen-storing alloy storage space, a gaseous hydrogen storage gap, and a circulating heat exchange system for absorbing heat when the hydrogen storage alloy absorbs hydrogen and heating the hydrogen alloy to release hydrogen. Source: Patent |
| Technology / Innovations |  | MgB ₂ ultrathin nanosheets, created to store hydrogen, have 50 times greater storage capacity than the bulk form of MgB ₂ . Source: Wiley |








DYNAMICS

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| Supply Chain Activities |  | The initiative by the Spanish, French, and Portuguese gas transmission system operators aims to make the gas network fit for hydrogen by prioritizing the development of hydrogen, its compression and above-ground storage, and alternatives for coating and cleaning pipelines. Source: Smart Energy International |
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DIVERSIFICATION

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| Company Collaboration |  | Gasunie has partnered with STORAG Etzel for H2CAST, a hydrogen storage project in the Etzel caverns in Saxony, Germany. The expected project completion date is in 2026. Source: Offshore Energy |
| Company Collaboration |  | Energy Vault partnered with PG&E to build a utility-scale battery plus green hydrogen long-duration energy storage system with a minimum of 293 MWh of dispatchable carbon free-energy. The expected supply from the facility is at least 48 hours of energy during planned outages and potential public safety power shut-offs. Source: Business Wire |
| Company Collaboration |  | Vopak and Hydrogenious partnered in a 50-50 joint venture, LOHC Logistix, specializing in hydrogen storage, transport, and supply. Source: Offshore Energy |
| Company Collaboration |  | GKN and Circle Green announced that the hydrogen microgrid project utilizing GKN's metal hydride hydrogen storage in Circle Green Technical Park is operational. Source: Hydrogen Central |
| Company Collaboration |  | Lhyfe and Centrica signed an MoU to jointly develop an offshore renewable green hydrogen production, storage, and distribution system in the UK. Source: Company Website |

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| Company Collaboration | | HDF and ZETDC signed an MoU to develop Zimbabwe's first hydrogen power plant, which produces electricity from the produced hydrogen and has hydrogen storage facilities. Source: Clean Technica |
| VC Investments | | Corre Energy raised 8.9 million by placing 2 million shares to be used to continue the development of the company's Zuidwending project in the Netherlands and the Green Hydrogen Hub in Denmark. Source: RTE |

| DRIVERS | | |
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| Government Policies | | The EU aims to establish an end-to-end hydrogen value chain through the European Hydrogen Bank, the financing of which will be backed through an auction system to support producers through a fixed premium per kg for up to 10 years of operation. Source: European Commission |
| Government Policies | | The Union Budget 2023 budgeted hydrogen production and battery storage to meet India's 2030 Green Hydrogen Goals allotting a total of ₹ 19,744 crores. Source: Economic Times |
| Others | | DOE to award \$47 million in funding for research, development, and demonstration of low-cost, clean hydrogen technologies, including hydrogen delivery and storage technologies. Source: Green Congress |

SOLUTION PORTFOLIO – TECHNOLOGY RESEARCH & ADVISORY

| IP Strategy | Technology Intelligence | Growth & Strategy |
|--|---|--|
| How best can we proactively manage and monetise our technical knowhow / intellectual property? | How best can we keep abreast of technology trends, competitor activity and headwinds / tailwinds in our domain? | Which technologies do we invest in? How do we ensure quick wins? Speed to market? |
| <ul style="list-style-type: none"> IP Portfolio Analysis IP Monetisation IP Valuation Prior Art Searches | <ul style="list-style-type: none"> Competitor Benchmarking Tech / IP Landscapes Technology Watch Market Analysis / Trends | <ul style="list-style-type: none"> R&D Strategy Roadmaps Technology Scouting Open Innovation Product Development |

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| GROWTH ADVISORY | INVESTMENT RESEARCH & ANALYTICS | VALUATION & FINANCIAL ADVISORY | TECHNOLOGY RESEARCH & ADVISORY | PROCUREMENT & SUPPLY CHAIN INTELLIGENCE |

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