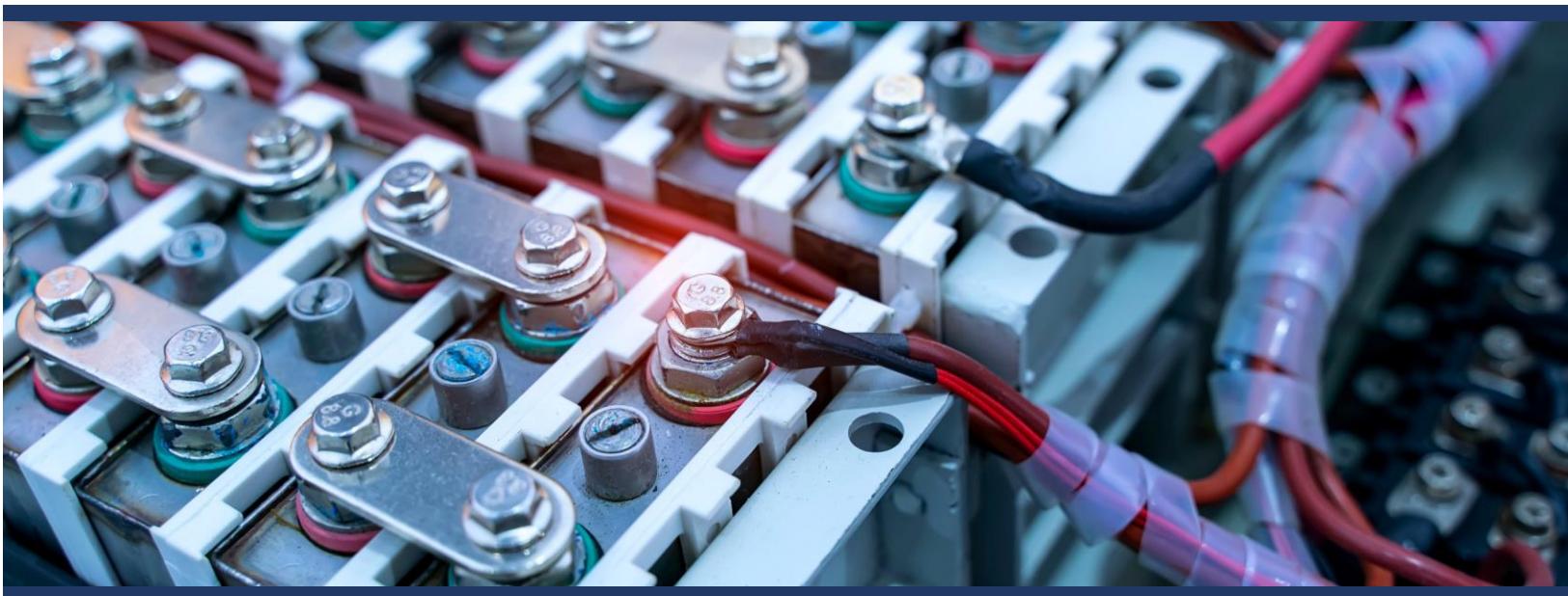


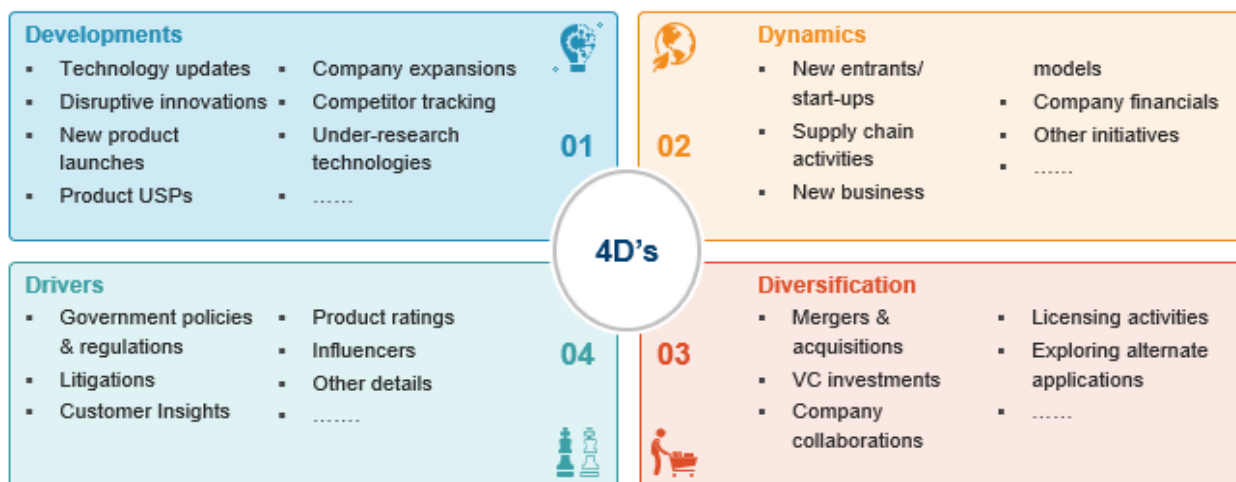
INTELLOTRACKER

Long Duration Storage

April 2023













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







DEVELOPMENTS

New manufacturing set-ups		Hydrostor is building a 300 MW to 500 MW advanced-CAES facility in Ontario and has signed a power purchase agreement (PPA) with community energy provider Central Coast Community Energy. Source: PV Magazine
New manufacturing set-ups		ESS Inc completed the installation of its automated manufacturing line at its plant in Wilsonville, Oregon. It is expected to produce ~800MWh per year of its flow batteries, which use an all-iron and saltwater electrolyte. Source: Energy Storage news
New manufacturing set-ups		Two Energy Warehouse systems will be delivered by ESS Inc. to the Turlock Irrigation District (TID) in Central California. The first-ever installation of solar panels over irrigation canals in the United States will be combined with the EWs. Source: Company Website
New manufacturing set-ups		ESS Inc. will deliver its iron flow battery solution to Amsterdam Airport Schiphol, in Q1 2023. The Energy Warehouse will be used in a pilot to enable the retirement of polluting diesel generators in the future. Source: Company Website
New manufacturing set-ups		Central Coast Community Energy (CCCE) has signed a \$774 million deal with Hydrostor to develop an energy storage center based upon compressed air technology. Source: Santa Barbara Independent
New manufacturing set-ups		A new form of long-duration energy storage will be tested in a pilot project run by WEC Energy Group at its Valley Power Station in Milwaukee. Source: Cision PR Newswire
Technology/Innovations		The first of ESI's long-duration, grid-scale batteries completed the final stage of commissioning and company's first production batteries are currently being delivered to a customer's trial site. Source: Packaging Revolution
Technology/Innovations		Researchers have proposed Underground Gravity Energy Storage (UGES) which can discharge electricity by lowering large volumes of sand into an underground mine through the mine shaft. UGES stores electricity by elevating sand from the mine and depositing it in upper storage sites on top of the mine. Source: MDPI
Technology/Innovations		To achieve long-term thermochemical energy storage, domestic heat supply, and carbon capture, Chinese researchers proposed a calcium looping system powered by excess renewable electricity. Source: Elsevier
Technology/Innovations		The research is related to a novel isothermal compressed air energy storage (CAES) consisting of two floating storage vessels in the deep ocean. It operates by balancing the pressure of the upper and lower tanks with the oceanic pressure. Source: Elsevier










DYNAMICS

Company Financials		Energy Vault's revenue for the year ending December 31, 2022 totaled \$145.9 million, driven by the strong Q4 project ramp from contracts executed in Q3 2022. Source: Market Screener
Key Initiatives		The U.S. Department of Energy and partners have announced progress toward a memorandum of understanding (MOU) to accelerate the commercialization of long-duration energy storage (LDES). Source: T&D World




DIVERSIFICATION

VC Investments		Noon Energy has acquired \$28 million in Series A funding to market its carbon-oxygen battery technology for long-term energy storage. Source: Clean Technica
VC Investments		VFlowTech has raised US \$10 million in a series A funding round. The company will use the funding to expand production of its 250 kWh modular vanadium-based long-duration energy storage solutions and set up a 200 MWh production line. Source: ETN
VC Investments		Zinc8 Energy Solutions has received approval for a grant from the Empire State Development ("ESD") of up to US\$9 million in performance-based Excelsior Jobs Program ("EJP") tax credits to incentivize the Company to locate and establish its first US-based production facility in New York State. Source: Company Website
Licensing Activities		ESS Tech announced certification of its S200 battery modules to the Underwriters Laboratories' (UL) 1973 standard. The certification confirms quality, resilience and ability to operate safely and effectively in a variety of conditions. Source: Seeking Alpha

Company Collaboration		Pacific Gas and Electric (PG&E) and Energy Vault has partnered to build the largest green hydrogen long-duration energy storage system in the US. The system will be able to provide 293 MWh of carbon-free energy during a power outage. Source: Utility Drive
Company Collaboration		Xcel Energy and Form Energy have entered into formal agreements for the deployment of Form Energy's iron-air battery systems at two of Xcel Energy's retiring coal plant locations. Source: Business Wire
Company Collaboration		Malta Corp. and the Orlando Utilities Commission will work together to develop a long-duration energy storage facility. The storage method used by Malta transforms excess electricity into thermal energy that is stored in salt and coolant. Source: Business Wire



DRIVERS

Others		The definition, importance, and needs of long-duration energy storage (LDES) in the Indian market were discussed at SESI 2023, along with a variety of cutting-edge technologies that have benefited from the most recent budgetary release. Source: ETN
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SOLUTION PORTFOLIO – TECHNOLOGY RESEARCH & ADVISORY



IP Strategy

How best can we proactively manage and monetise our technical knowhow / intellectual property?



Technology Intelligence

How best can we keep abreast of technology trends, competitor activity and headwinds / tailwinds in our domain?



Growth & Strategy

Which technologies do we invest in?
How do we ensure quick wins?
Speed to market?

- IP Portfolio Analysis

- IP Monetisation

- IP Valuation

- Prior Art Searches

- Competitor Benchmarking

- Tech / IP Landscapes

- Technology Watch

- Market Analysis / Trends

- R&D Strategy Roadmaps

- Technology Scouting

- Open Innovation

- Product Development



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RESEARCH
& ANALYTICS



VALUATION
& FINANCIAL
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& ADVISORY



PROCUREMENT &
SUPPLY CHAIN
INTELLIGENCE