

GROUP 6



Transformative Technologies Next-Gen Battery Technology

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Agenda

A | Market Analysis

1. Introduction to the industry
2. Technology
3. Customer
4. Market
5. Competition
6. External factors

B | Investment & Finance

1. Landscape
2. Filtering
3. Evaluation
4. Recommendation



A | Innovation & Development

1. Introduction to the industry
2. External factors
3. Customer
4. Technology
5. Market
6. Competition
7. Landscape

Exploring 6 Next-Gen Battery Technologies expected to power the future within 5-10 years

	Lithium-Sulfur Batteries	Sodium-Ion Batteries	Cobalt-Free Lithium-Ion Batteries	Iron-Air Batteries	Zinc-Based Batteries	Solid State Batteries
Technology	Li+ Anode / Sx cathode	C / Na Anode	C/Si anode / NMA cathode	Fe Anode / air cathode	Zn Anode	Solid electrolyte
Advantages	High energy density Lightweight Potentially lower cost	Abundant raw materials Lower cost Safe	Lower cost Ethical sourcing Sustainability	Low cost Long-duration Eco-friendly	Safe Eco-friendly Cost-effective	High energy density Safe Long life
Challenges	Limited cycle life Capacity loss	Low energy density Limited cycle life	Maintaining performance and stability without cobalt	Low energy density Slow charge/discharge rates	Limited energy density Dendrite formation	Complexity Cost Scalability
Stage	RnD with some early-stage prototypes	Pilot projects and early commercialization	Commercialization in progress	Research and pilot projects	Limited commercialization	Early commercial stage with ongoing research and pilot projects
Use	Aviation, drones, and high-energy applications	Grid storage and low-cost applications	Consumer electronics and EVs	Grid storage and renewable energy integration	Small and large-scale applications	Electric vehicles (EVs) and portable electronics
Companies	OXIS Energy Sion Power	Natron Energy Faradion	Tesla Panasonic	Form Energy ESS Inc.	Zinc8 Eos Energy	TOYOTA QuantumScape



Revolutionizing Energy: Next-Gen Batteries Transforming Industries

The battery industry is at the forefront of global innovation, **driving advancements in energy storage solutions that are critical for the transition to electric mobility, renewable energy integration, and more sustainable power systems** across various sectors. Companies are racing to develop technologies that offer higher energy densities, improved safety, and lower costs.

Lithium-Sulfur Batteries

Lightweight with high energy capacity, promising for aerospace and electric vehicles.

Cobalt-Free Lithium-Ion Batteries

Eco-friendly and cost-reducing by eliminating cobalt, suited for electric vehicles and consumer electronics.

Sodium-Ion Batteries

Cost-effective and abundant, ideal for large-scale energy storage and grid applications.

Iron-Air Batteries

Long-duration energy storage at low cost, perfect for renewable energy and grid storage.

Zinc-Based Batteries

Safe, low-cost, and scalable, making them a great option for renewable energy storage.

Solid State Batteries

High energy density, improved safety, and extended lifespan, driving innovation in electric vehicles and portable devices.

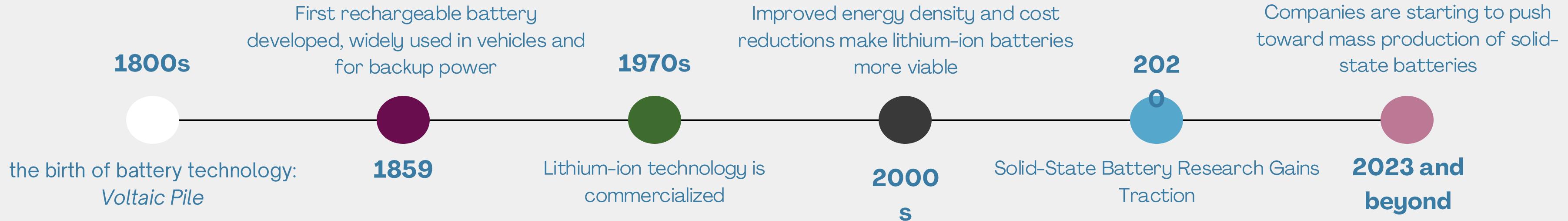
Powering the Future: How Solid-State Batteries are Revolutionizing Energy and Mobility

Key Sectors:

Energy Storage: EV range, charging times, and safety

Automotive Industry: Sustainable and reliable solutions for renewables

Over the past few decades, the demand for more efficient, safe, and sustainable battery solutions has accelerated with the rise of electric vehicles (EVs) and renewable energy storage.



Unlocking Potential: The Game-Changing Advantages and Industry Impact of Solid-State Batteries

Key Sectors:

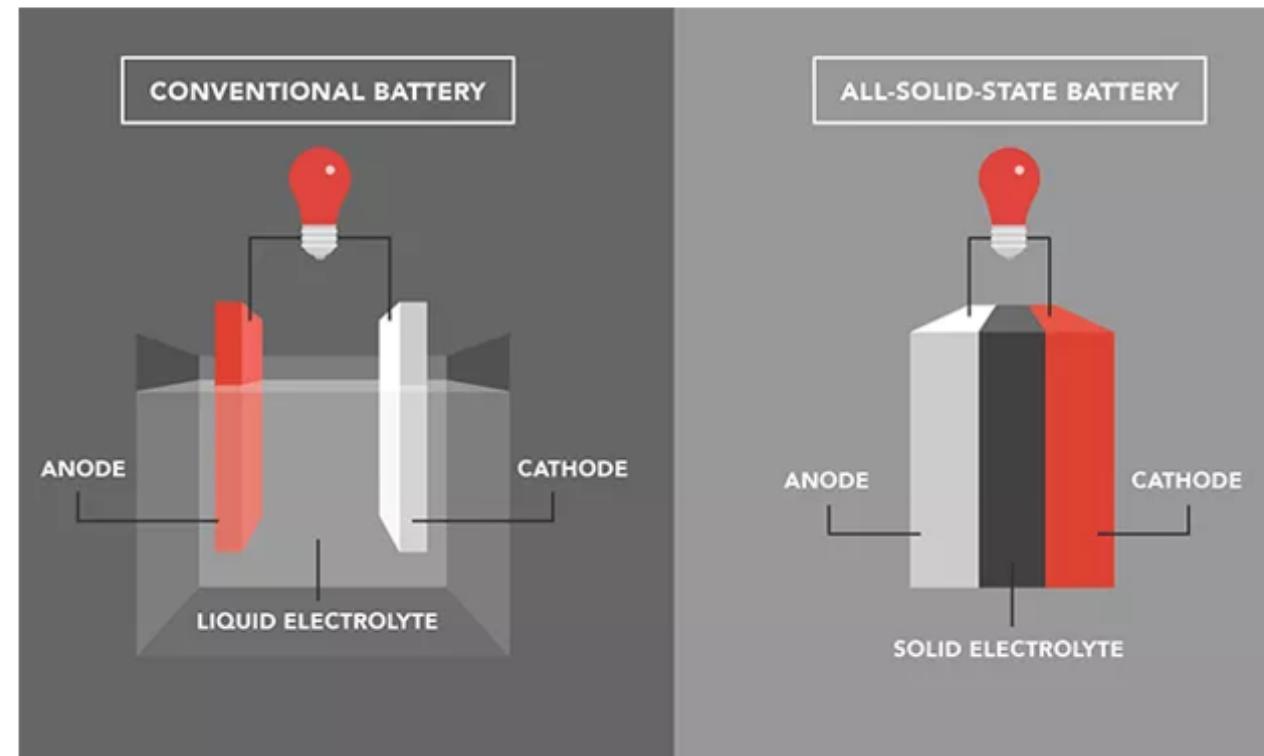
- Energy Storage: EV range, charging times, and safety
- Automotive Industry: Sustainable and reliable solutions for renewables

Key Advantages:

- Higher energy density: Greater range for EVs and longer life for storage systems
- Reduced Risk: Eliminates the risk of fire and thermal runaway due to solid electrolytes
- Faster Charging: Potential for drastically reduced charging times
- Longer lifespan: Less degradation over time compared to traditional lithium-ion batteries.



Solid-state batteries, with their enhanced safety, higher energy density, faster charging, and longer lifespan, are a prime investment opportunity



Revolutionary Technology

Concept: Batteries that use solid electrolytes instead of liquid ones.

Advantages:

- Improved Safety: Non-flammable solid electrolytes reduce the risk of fires and explosions.
- Higher Energy Density: Potential to store more energy in a smaller space, ideal for electric vehicles (EVs).
- Faster Charging Times: Can charge more quickly than traditional lithium-ion batteries.
- Longer Lifespan: More durable and can withstand more charge cycles.

Major Players: Toyota, Volkswagen, startups like LionVolt.

Why Invest Now?

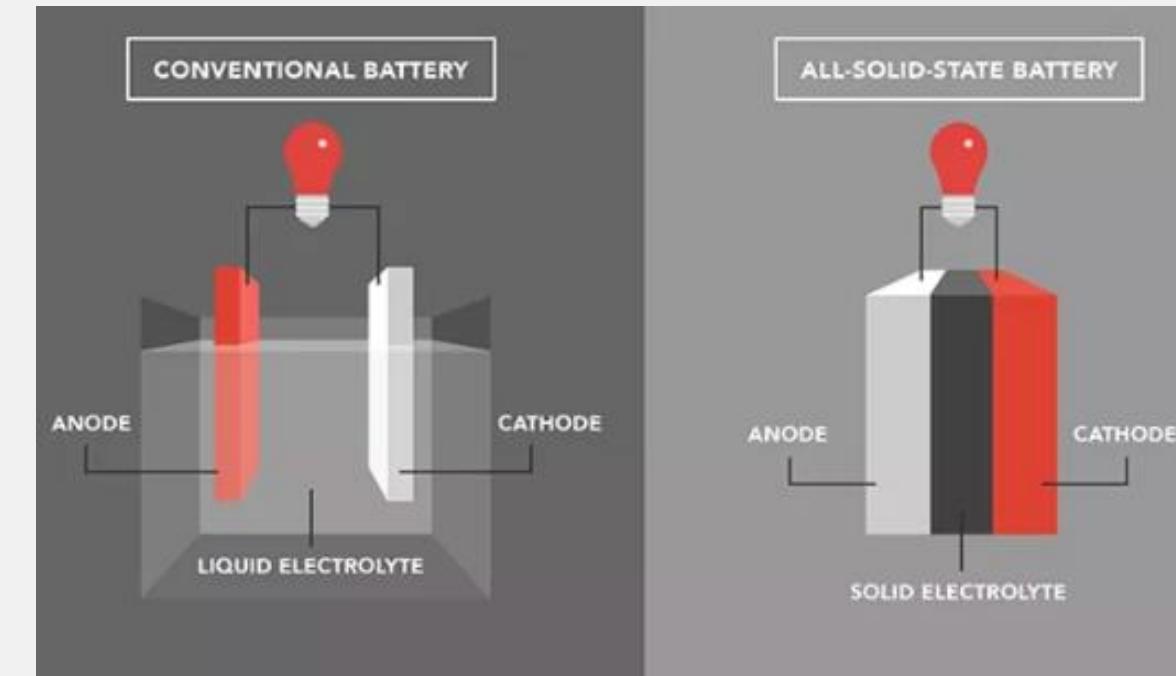
- Strategic Importance: Key for the EV industry and beyond, with significant investments from China, Japan, and South Korea.
- Growing Market Demand: Increasing need for safer, more efficient batteries in EVs and portable electronics.
- Technological Innovations: Continuous advancements are making solid-state batteries more viable for mass production.
- Environmental Impact: Solid-state batteries are more environmentally friendly, aligning with global sustainability goals

The high energy density of the Solid-state Batteries make them a prime investment opportunity.

Revolutionary Technology: Batteries that replace the use of liquid electrolytes with [solid electrolytes](#).

Advantages

- Improved Safety
- Higher Energy Density
- Faster Charging
- Longer Lifespan



Investment Potential

- Strategic Importance
- Growing Market Demand
- Technological Innovations
- Environmental Impact

Major Players: [Toyota](#), [Volkswagen](#), startups like [LionVolt](#)

Changing customer needs and Segmentation

Evolving consumer demand

Consumer demand and preferences are changing to sustainable energy storage solutions. This change is prominent in EVs, energy storage systems, and consumer electronics.

Demand is increasing for:

- Sustainable solutions with lower environmental impact.
- Higher energy storage capacity and shorter charging time.
- Solutions with enhanced safety.
- Increased number of charging cycles and battery life

Key market segments for SSBs



Automotive



Energy storage

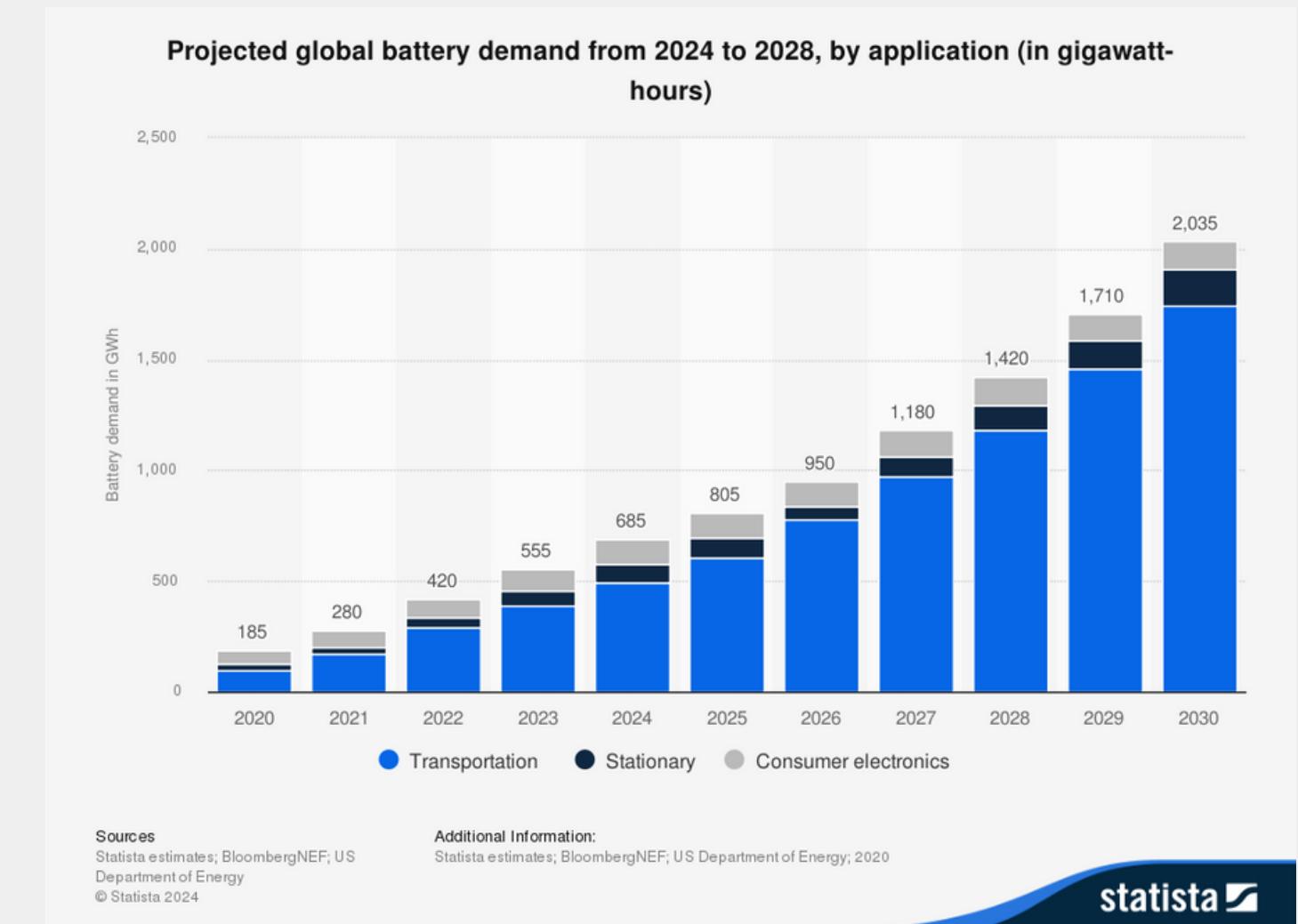
EV manufacturers and buyers need safe batteries with high energy storage capacity and increased charging speed.

Energy-producing and storing companies need sustainable energy storage solutions with higher energy storage speeds and increased energy density.



Consumer electronics

The end users need smaller battery sizes, decreased weight, and increased battery life.



Future projection of global battery demand (sector-wise)

Customer personas



Performance driven electronic

Age: 20-30, Young Professional user

- Prefers cutting-edge technology for daily usage of devices.
- Values: Performance, convenience, latest technology.
- Needs: Better battery life and faster charging, which withstands high-performance uses.



EV fleet manager for

Age: 35, Logistics manager at a logistics company

- Focused on reducing emissions and reducing overall environmental impact.
- Values: Sustainability and Safety.
- Needs: faster charging, increased range of vehicles, and improved safety.



Renewable energy advocate

Age: 45, A sustainability enthusiast who has installed solar panels and seeks to maximize renewable energy usage

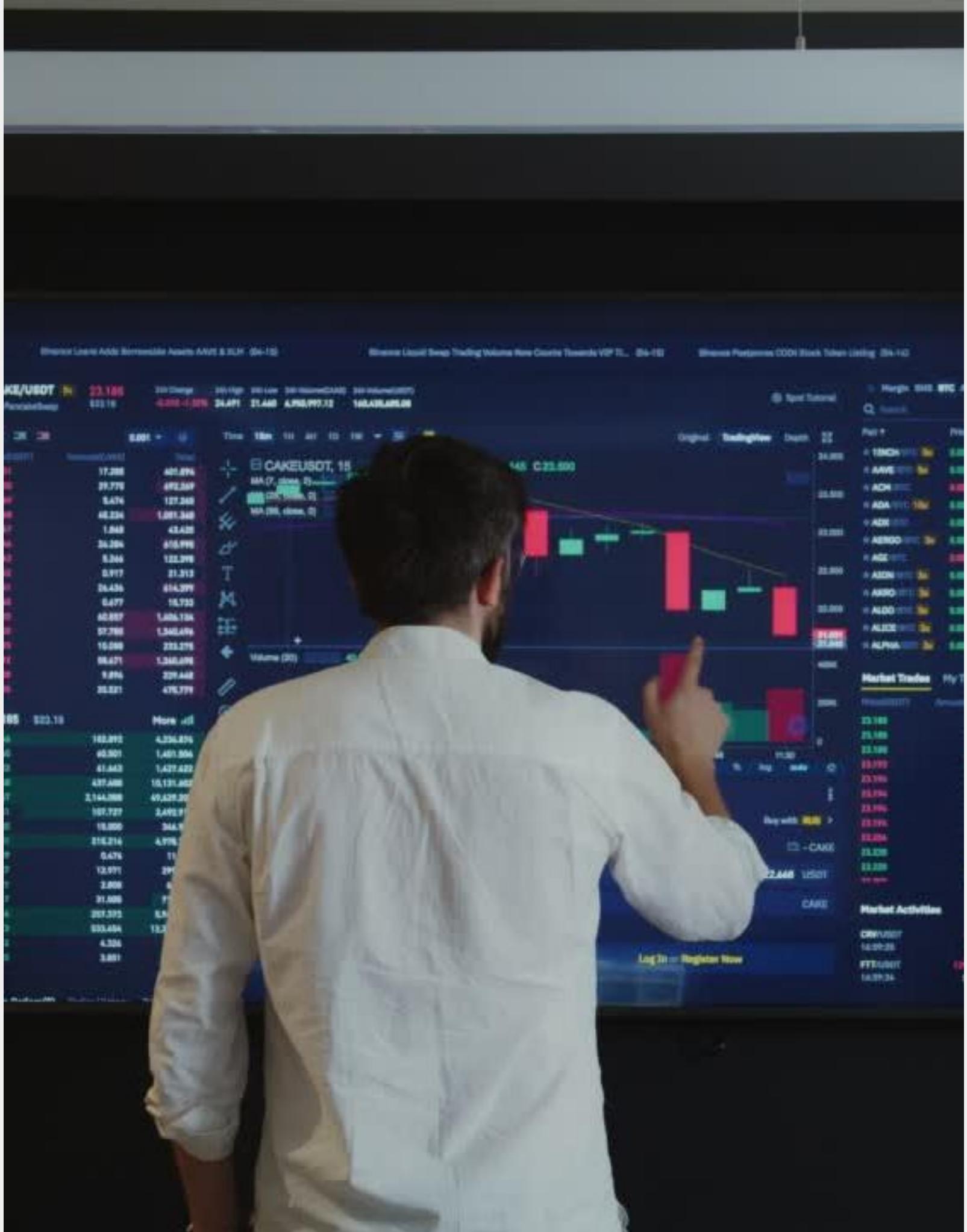
- Interested in reducing carbon footprint and self-reliance.
- Values: Environmental safety, long-term cost savings.
- Needs: High energy density durable solutions with improved safety



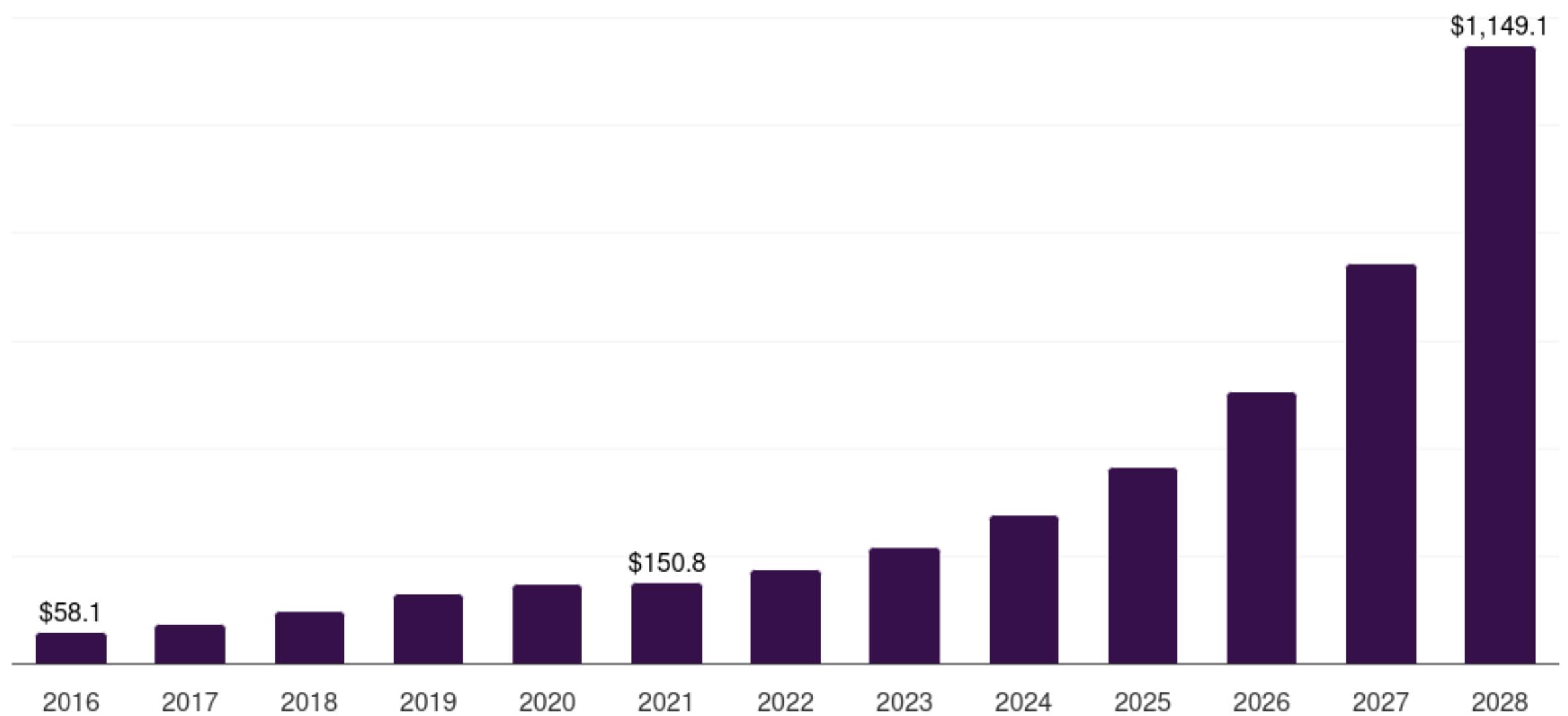
B | Market & Industry

1. Market
2. Competition
3. Landscape

MARKET ANALYSIS



Market Analysis

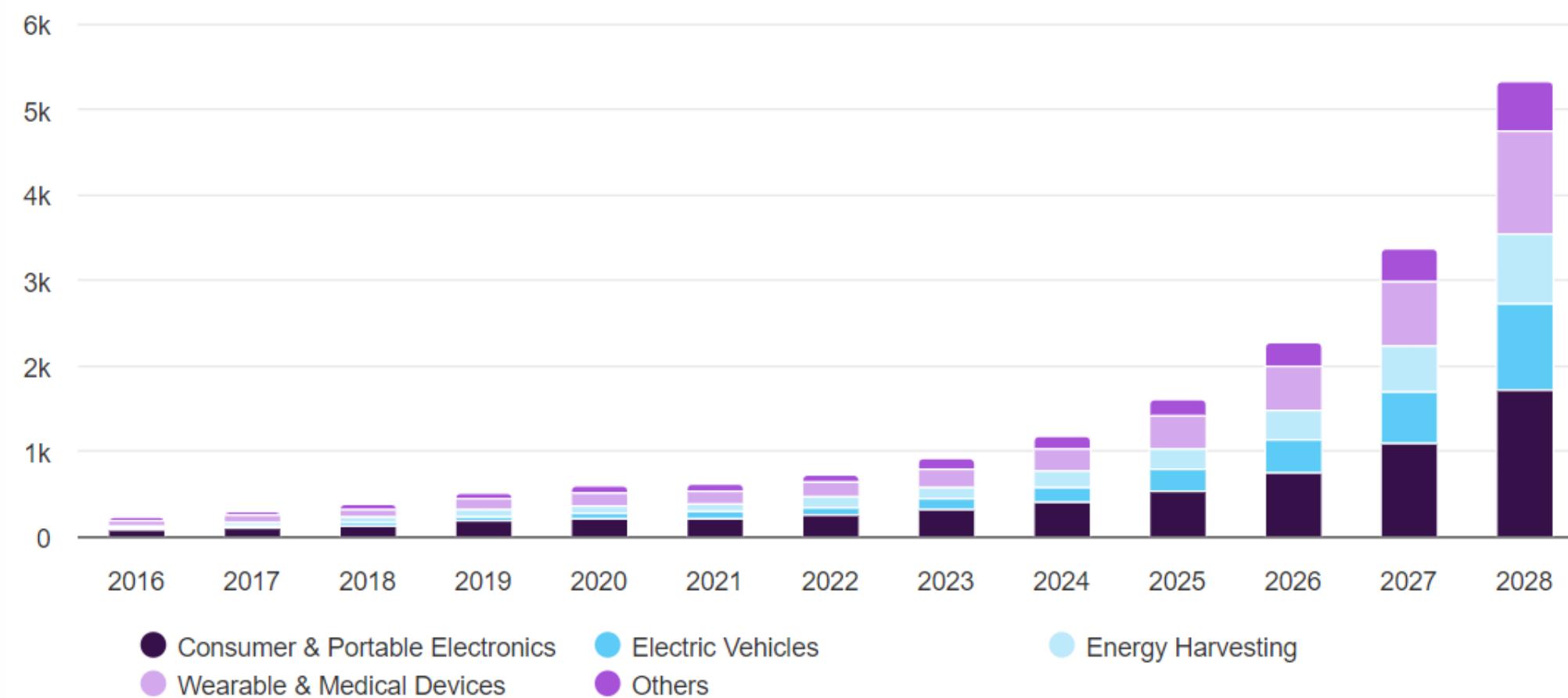


Europe solid state battery market, 2016-2028
(US\$M)

- The solid-state battery market is projected to grow at a CAGR of 35%-40% over the next five to six years.
- By 2028, the market is expected to reach a value of 1.4 billion USD to 2 billion USD, driven by demand from electric vehicle manufacturers and consumer electronics.

Leveraging Key Drivers for Growth in Solid-State Battery Startups

Global solid state battery market statistics, by application, 2016-2028 (US\$M)



Download ▾

Electric Vehicles

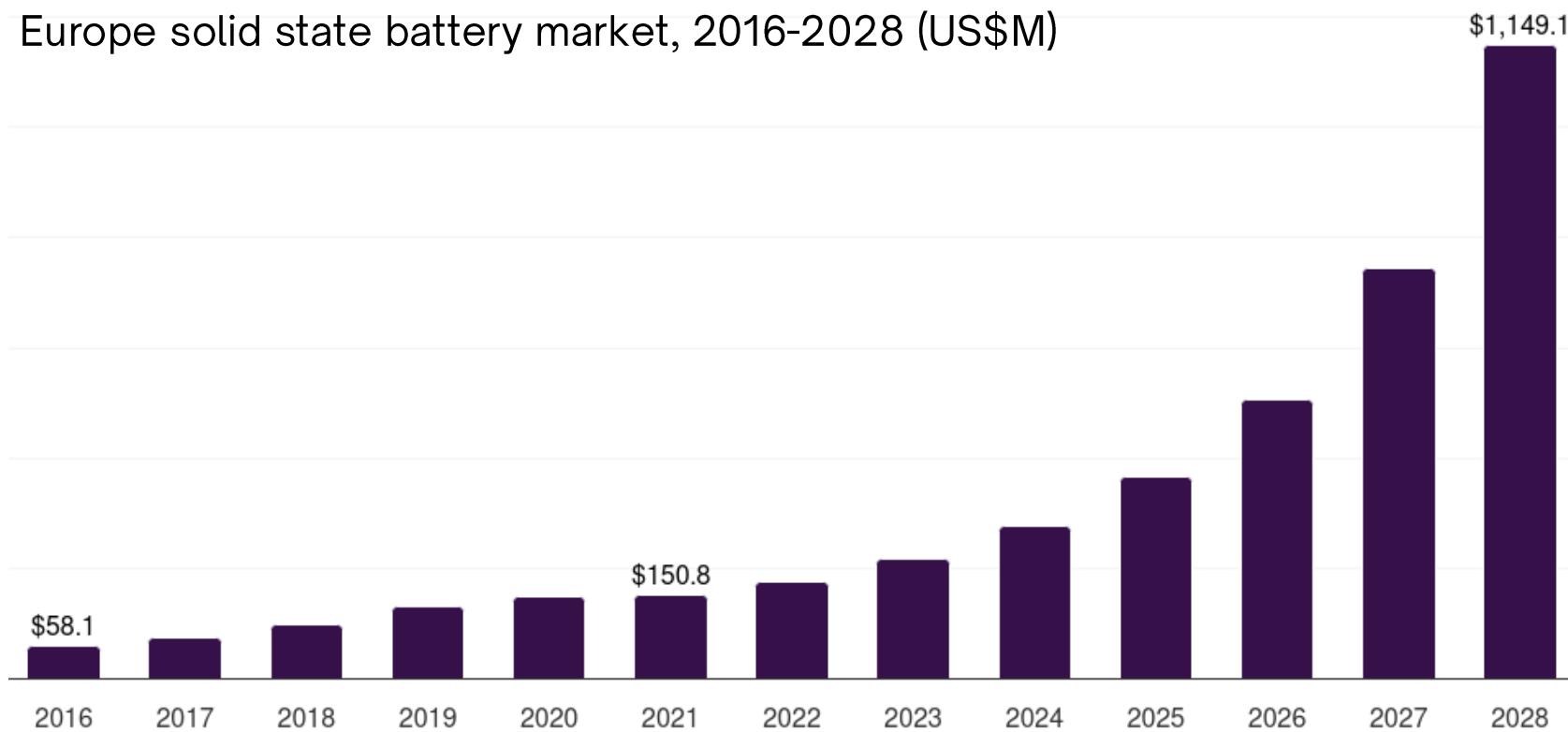
- The EU law will require all new cars sold to have zero CO2 emissions from 2035, and 55% lower CO2 emissions from 2030

Energy Harvesting

- Their ability to efficiently absorb and store energy from renewable sources while maintaining safety and long-term storage capacity.

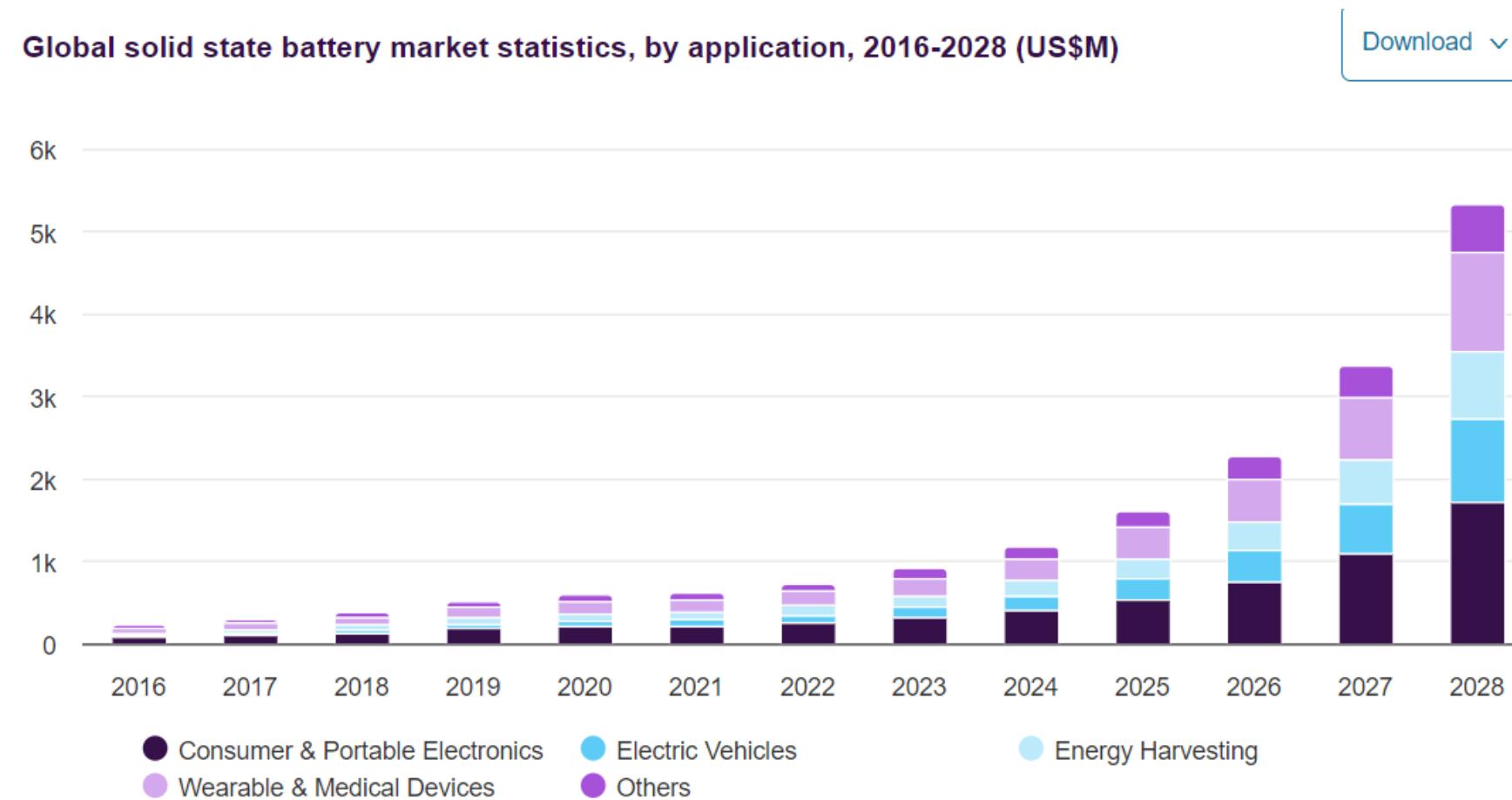
Leveraging Market Trends and Drivers for Growth in Solid-State Battery Startups

Europe solid state battery market, 2016-2028 (US\$M)



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Electric Vehicles

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Energy Harvesting

- Their ability to efficiently absorb and store energy from renewable sources while maintaining safety and long-term storage capacity.

Identifying Key Barriers to Growth in Solid-State Battery Startups



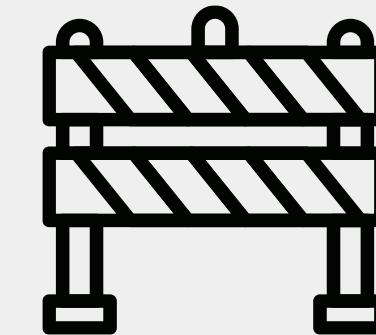
High Production Cost

Large-scale manufacturing is difficult given manufacturing complexity and the usage of rare or expensive elements, including lithium or solid electrolytes.



Scalability Issues

Securing this level of investment can be a challenge for entrepreneurs, especially in a competitive market.



Limited Commercialization

There is currently little practical use for the technology in automobiles or consumer electronics. Limited Commercialization as barrier to growth = “nice idea, but we don’t have a use case yet...”.

That's not the case with SSB → its the opposite: its a growth factor

Strategic Alliances

PowerCo

Volkswagen &
QuantumScape



VW subsidiary with non-exclusive
right to produce batteries for
up to 1 million EV per year using the
QuantumScape Technology

(40 GWh per year, with option up
to 80 GWh/year)

<https://www.volkswagen-group.com/en/press-releases/powerco-and-quantumscape-announce-ground-breaking-agreement-to-industrialize-solid-state-batteries-18494>

BMW & Solid Power



Licence to research and develop
SolidPower Technology in own R&D
departments but also
collaboration of new findings

<https://www.press.bmwgroup.com/deutschland/article/detail/T0407744DF/bmw-group-und-solid-power-verstaerken-forschungspartnerschaft?language=de>

ACC

Mercedes-Benz, TotalEnergies &
Stellantis



- ACC is a joint venture between TotalEnergies, Stellantis, and Mercedes-Benz
- They are making substantial investments in research and the construction of production facilities to facilitate the production of electric vehicles (EVs). Their objective is to achieve a battery capacity of over 40 GWh by the end of the decade.

<https://www.press.bmwgroup.com/deutschland/article/detail/T0407744DF/bmw-group-und-solid-power-verstaerken-forschungspartnerschaft?language=de>

Market Stagnation - End of Growth in 2024?

ACC-Werk Kaiserslautern

Baustopp für die Batteriefabrik - Superlative

Stand: 22.06.2024 08:26 Uhr

In Kaiserslautern wollen europäische Autohersteller batteriefertigen. Doch das Projekt legt eine "Pause" ein. Grundlagen der Batterien sollen offenbar auf

Pläne von SVolt in Heusweiler ins Stocken geraten

Mit Informationen von Thomas Gerber

Vorlesen

Die Zweifel an den Plänen des chinesischen Batterieherstellers SVolt auf dem Linslerfeld in Überherrn und in Heusweiler-Eiweiler wachsen. Wie es mit dem Standort in Heusweiler weitergeht, ist derzeit offenbar unklar.

Nächster Schlag für VW: Batterie-Werk ist auch in Gefahr

12. September 2024 | Karl Lüdecke



Sparwünsche halbieren die Batteriezellenfertigung in Salzgitter.

Bei VW wird derzeit der Rotstift angesetzt. Der Tarifvertrag für die Beschäftigungssicherung ist bereits gekündigt, Werksschließungen werden nicht mehr ausgeschlossen. Auch die geplante Batteriefertigung in Salzgitter wird offenbar stark gekürzt.

From August 2023 to August 2024 69 % less EV were sold in EU.

As a consequence some european car manufacturer temporary stopped expansion in new batterie plants.

those **short-term reactions** to fallen demands could lead to in **longterm loss in the market-leading** position of those companies.

Cooperation within the market and OEM as key driver are peculiarity in the SSB arena.

Cooperations between different Actors and Stakeholders	OEM are key (investment) driver	SSB varies strongly as a technology - so companies focus on R&D
<ul style="list-style-type: none">• i.e. strategic alliances, joint ventures, investments• cooperations both horizontal and vertical (in the value chain)	<ul style="list-style-type: none">• OEM (mostly EV) depend on innovation and breakthrough in battery market → lot of investments are done by these firms	<ul style="list-style-type: none">• instead of strong rivalry and bargaining in prices (“external view”)• companies look for early milestones and success (“internal view”)

Sources: BMW Blog, 2023; Electrek, 2024; Electrive, 2023, 2024; Ecomento, 2024; Heise, 2023; IAA Mobility, 2023; Not a Tesla App, 2024; ProLogium, 2024; Repairer Driven News, 2024; Samsung SDI, 2024; TopSpeed, 2024; Toyota, 2021; Volkswagen Group, 2024

The competition in the SSB market is multidimensional with four different groups.

I Geo-Political	II „Traditional“ Battery Industry	III "New" Players and Startups	IV OEMs
Goverments recognise importance of technology to strengthen <ul style="list-style-type: none">• regional power• power in EV market	Trying to enhance existing products with new advancements, but also have R&D in SSB market	Focus on R&D, as each of these players follow different ways to archive success. Early milestones and success brings investments. Looking for big Partners.	The OEMs need of EV is the driving force in this field.
Example EU & European governments support with fundings to build EU based Hubs	Example LG Energy Solutions, CATL, Panasonic, Samsung, etc. all perform R&D in SSB.	Example PowerCO – non exclusive Joint venture between VW and QuantumScape	

Sources: Ecomento, 2024; Electrive, 2024; European Commission, 2019, 2021, 2023; InnoEnergy, 2024; Kang, 2024; LG Energy Solution, 2023; Samsung Research, 2023; Volkswagen Group, 2024; Battery News, 2024

External Factors Influencing the Development of Solid-State Battery

Socio-Economic factors

- Growing interest in EV and renewable energy storage
- Significant investments across Europe.

Political factors

- Support from EBA
- National government subsidies
- EU's Horizon research funding

Regulatory factors

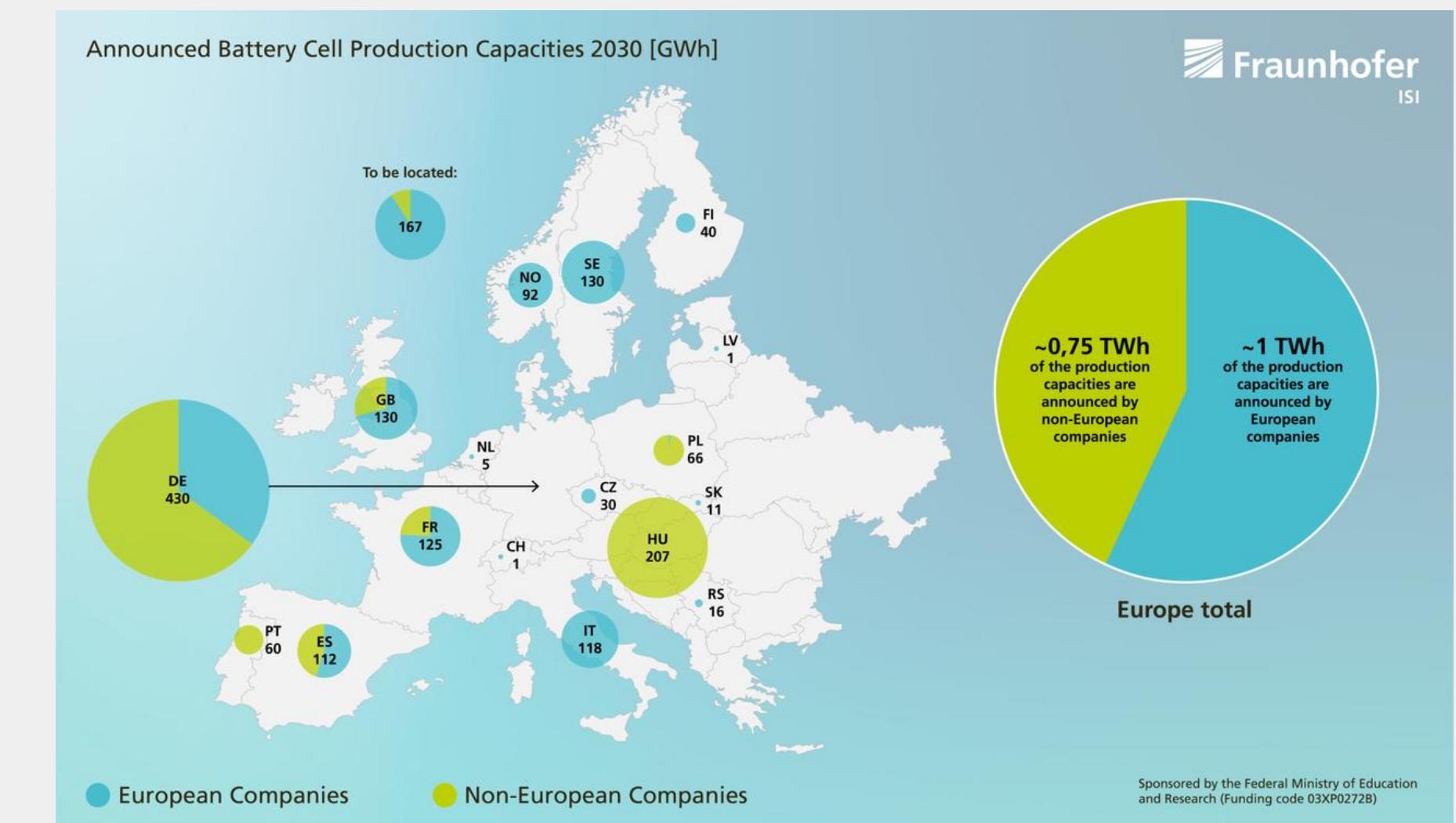
- Potential for favourable safety standards
- EU's sustainability focus may benefit this technology

Market Impact

- Expected significant market growth
- Potential disruption of traditional lithium-ion market
- Transformation of the automotive and energy storage industry

Technological factors

- Research by institutions like Fraunhofer IKTS
- Manufacturing challenges in transitioning from lithium-ion
- Ongoing research to improve performance



External Factors Influencing the Development of Solid-State Battery

Socio-Economic factors

- Growing interest in EV and renewable energy storage
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Political factors

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Regulatory factors

- Potential for favourable safety standards
- EU's sustainability focus may benefit this technology



Political and Regulatory factors impacting the solid-state battery startups in EU

The newly adopted Battery Regulation in EU, which came into force in August 2023 aim to ensure a level playing field for European companies and address environmental and social concerns. Key aspects include:

- Labelling and informational requirements about carbon footprint.
- Rules for replaceability, interoperability, safety and durability.
- 100% collection and recycling requirement for EV batteries
- Quantitative targets for recycling and recycled content in new batteries.

The European Battery Alliance, launched in October 2017, is a significant initiative to develop a competitive and sustainable battery industry through

- cell manufacturing value chain in Europe
- Developing a highly skilled workforce
- Ensuring sustainability of EU battery cell manufacturing

Government Policies and Regulation

The European Green Deal and related policies have created a supportive environment for green technology startups, including those in the solid-state battery sector. These policies aim to:

- Reduce carbon emissions
- Promoting renewable energy

Socio-Economic factors impacting the solid-state battery startups in EU

Market Potential:

- European battery market estimated at €250 billion annually by 2025
- 111 major battery projects under development, €127 billion total investment

Employment Impact:

- Significant job creation is expected in the battery sector
- The automotive industry employs 3.5 million in manufacturing

Supply Chain Challenges:

- Potential raw material shortage from 2030
- Limited EU domestic supply of battery materials

Financial Support and State aid

Through the Temporary Crisis and Transition Framework (TCTF), the EU has simplified regulations for state aid to battery factories, allowing large companies to receive 15–35% of their eligible investment costs.

Additional instruments for financial support include:

- Horizon framework program
- European Regional Development Fund (ERDF) & European Fund for Strategic Investments (EFSI)
- Innovation Fund.

Market Impact and technological factors impacting the solid-state battery startups in EU

Technological Transition:

- By 2030, lithium-ion batteries are expected to reach their energy density limits.
- Solid-state batteries with Li metal anode (LiM-SSB, Gen4b) will be the next major milestone.
- Due to their higher energy density, SSBs have intrinsic safety, durability, and extended driving ranges.

Market Adoption Projections:

- Prosche Consulting (*Ridder, 2023*) cars with SSBs to make up 5% to 15% of the market by 2035, i.e. up to 35 million vehicles.

Competitive Landscape:

- All major carmakers are investing SSB startups or research.
- This race to lead the field with SSBs creates a highly competitive environment for startups.

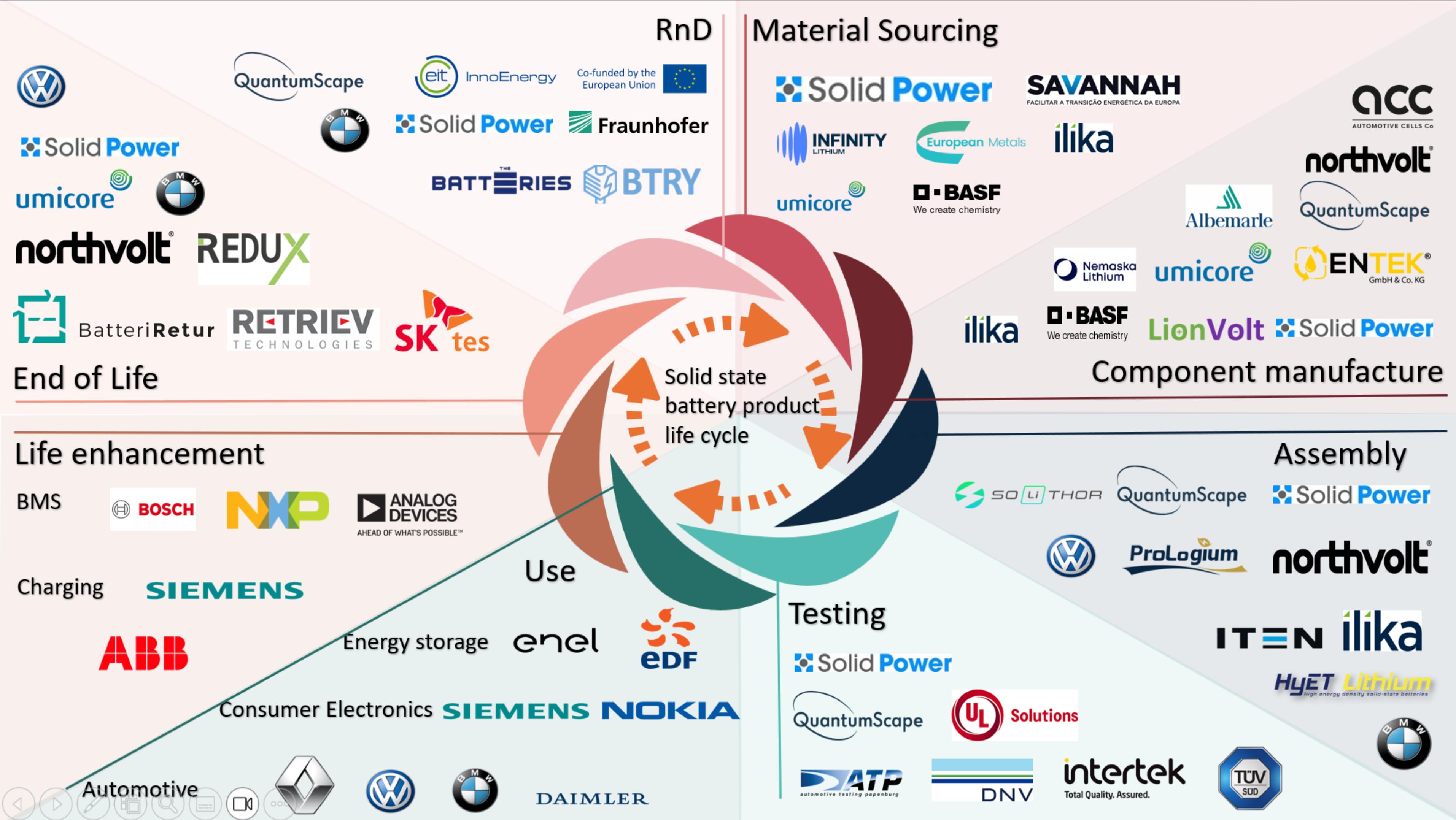
Infrastructure Adaptation:

- 40% of the machinery in existing lithium-ion gigafactories is suitable for making solid-state batteries.
- Thus, the need for infrastructure investment has significantly increased.

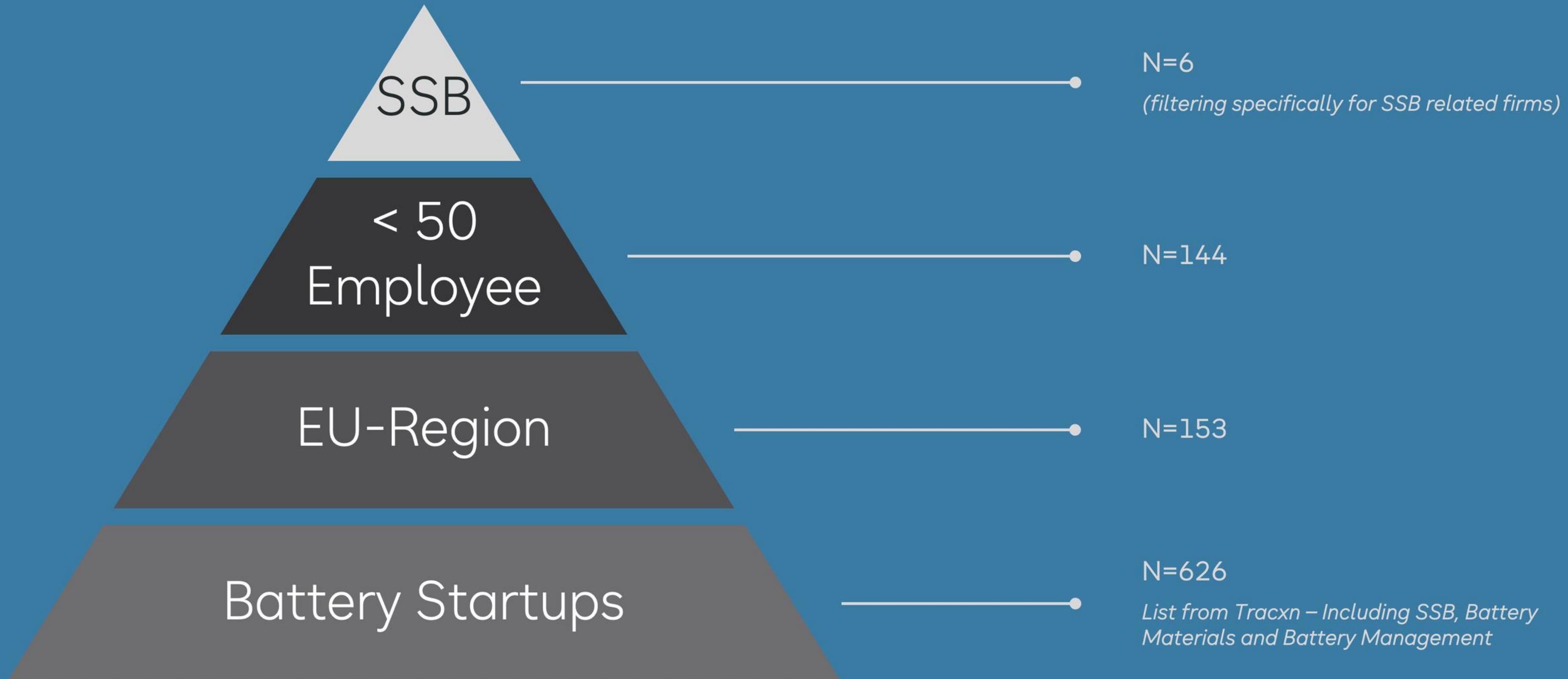


C | Investment & Finance

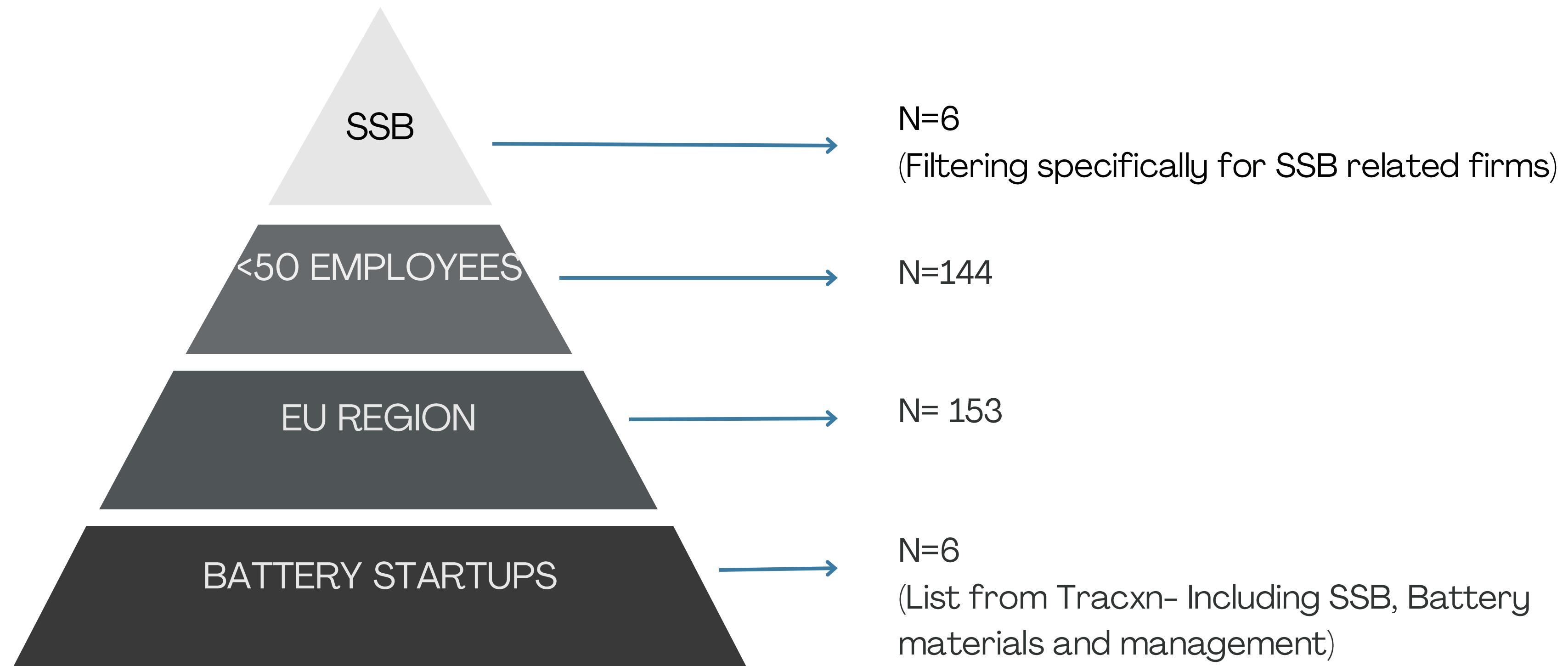
1. Filtering
2. Evaluation
3. Recommendation



Filters to shortlist solid-state battery startups



Filters to shortlist solid-state battery startups



Criterias selected?

Stage	Funding	Partnerships Network	Structure	Product Differentiation	Landscape	ESG
	<ul style="list-style-type: none">• FUND RAISED• INVESTORSTRUSTNESS• POTENTIAL GROWTH• CASH AVAILABLE• ROUND OF RAIINGS STAGE					

Criterias selected

	Development Stage	Funding	Partnerships %	Structure	Product Differentiation	Company performance	ESG
ITEN	★★★★★	★★★★★	★★★★	★★★★★	★★★★★	★★★★★	★★★★★
soLiTHOR	★★★	★★	★★★	★★★	★★★★★	★★★★★	★★★★
LIONVOLT	★★★	★★★	★★★★	★★★★★	★★★★★	★★★★★	★★★★
HyET Lithium <small>High energy density solid-state batteries</small>	★★★★★		★★★★★	★★★	★★★★	★★★★★	★★★★★
THE BATTERIES	★★★★★	★★	★★★	★★★	★★★★	★★★★★	★★★★
BTRY	★	★	★★★	★★★	★★★★★	★★★★★	★★★★

Criterias selected

ITEN= 25+50+80+112,5+80+75+20=442,5

SOLI= 15+20+60+75+90+75+17,5=352.5

LIONVOLT= 15+30+70+100+100+75+15 = 405

HYET = 297,5

BATTERIES: 25+20+60+50+70+60+17.5 = 302.5

BTRY = 5+10+60+75+100+45+15=310

Company	Development Stage 5	Funding 10	Partnerships 20	Structure 25	Product Differentiation 20	Company performance 15	ESG 5
ITEN	★★★★★	★★★★★	★★★★	★★★★★	★★★★★	★★★★★	★★★★★
SOLITHOR	★★★	★★	★★★	★★★	★★★★★	★★★★★	★★★★
LIONVOLT	★★★	★★★	★★★★	★★★★★	★★★★★	★★★★★	★★★
HyET Lithium <small>High energy density solid-state batteries</small>	★★★★★	★	★★★★★	★★	★★★	★★★★★	★★★★★
BATTERIES	★★★★★	★★	★★★	★★	★★★★	★★★★★	★★★★
BTRY	★	★	★★★	★★★	★★★★★	★★★	★★★

BTRY =

Criterias selected

Company	Development Stage 5%	Funding 10%	Partnerships 20%	Structure 25%	Product Differentiation 20%	Company performance 20%	ESG 5%
ITEN	★★★★★	★★★★★	★★★★	★★★★★	★★★★	★★★★★	★★★★
 SOLITHOR	★★★	★★	★★★	★★★	★★★★★	★★★★★	★★★★
LIONVOLT	★★★	★★★	★★★★	★★★★	★★★★★	★★★★★	★★★
HyET Lithium <small>High energy density solid-state batteries</small>	★★★★	*	★★★★	★★	★★★	★★★★	★★★★★
THE BATTERIES	★★★★★	★★	★★★	★★	★★★★	★★★★	★★★★
 BTRY	*	*	★★★	★★★	★★★★★	★★★	★★★

Criterias selected

Company	Development Stage 5%	Funding 10%	Partnerships 20%	Structure 25%	Product Differentiation 20%	Company performance 20%	ESG 5%
 SOLITHOR	★★★	★★	★★★	★★★	★★★★★	★★★★★	★★★★
 LIONVOLT	★★★	★★★	★★★★	★★★★	★★★★★	★★★★★	★★★
 HyET Lithium <small>High energy density solid-state batteries</small>	★★★★	*	★★★★	★	★★★	★★★★	★★★★★
 THE BATTERIES	★★★★★	★	★★★	★	★★★	★★★★	★★★★
 BTRY	*	*	★★★	★★★	★★★★★	★★★	★★★

Objectives in Designing Criteria

- The criteria are selected for a small venture capital firm.
- ..todo...

Criteria “Development Stage”

COMPANY	RATING	EXPLANANTION
ITEN	★★★★★	Producing and selling already two products. Plans to increase production capacity.
 SO Li THOR	★★★	Currently just success in laboratory, no prototype. But fast success within 2 years.
LIONVOLT	★★★	Two production plants for pilot production, but development stage is unclear.
 HyET Lithium <small>High energy density solid-state batteries</small>	★★★★	Very successful production of prototypes.
BATTERIES	★★★★★	Producing and selling of products.
 BTRY	★	Unclear, presumably just early R&D.

Criteria “Funding”

Criteria “Partnerships

COMPANY	RATING	EXPLANANTION
ITEN	★★★★	Strong in micro-battery and IoT partnerships
 SOLITHOR	★★★	Developing partnerships in research and EV sectors but lacks major industrial collaborators
LIONVOLT	★★★★	Growing network with tech institutes and potential in the automotive sector
 HyET Lithium <small>High energy density solid-state batteries</small>	★★★★	Strong in lithium extraction collaborations but limited partnerships in battery manufacturing.
 THE BATTERIES	★★★	Early-stage EU partnerships
 BTRY	★★★★	Well-established in energy and automotive networks

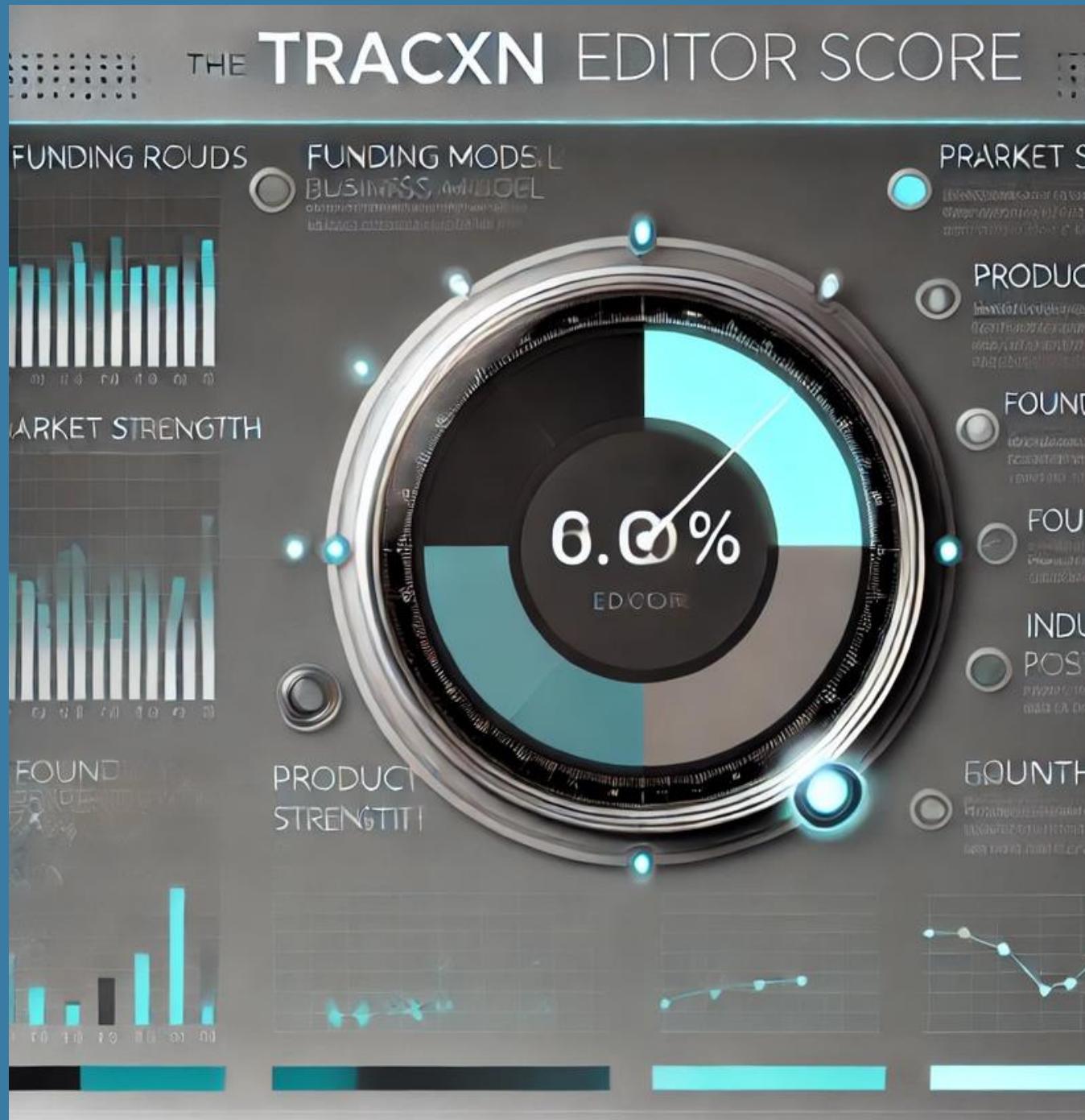
Criteria “Structure”

Criteria	ITEN	SO Li THOR	LIONVOLT	HyET Lithium	THE BATTERIES	BTRY
Founder	Fabien Gaben Strong background in the semiconductor industry	Dr. Fanny Bardé Huw W. Hampson-Jones Experience on future battery technology for xEVs (PHEV, HEV, BEV)	Maarten McGoldrick Dr. Sandeep Unnikrishnan Experience in the tech and energy sectors	Rombout Swanborn Experience in different technologies	Alexey Starovoytov Ayrat Khissamov Diverse experiences	Dr. Moritz Futscher Dr. Abdessalem Aribia Physicist and Chemist
Number of employees	Around 50 employees Over 40 engineers and researchers	Around 30 employees	Around 16 employees	Around 5 employees	Around 10 employees	Around 5 employees
Leadership	CEO-Vincent Cobée- CFO-Marie-Laure CTO-Dr. Ian Cayrefourcq CCO-Axel Fischer	R&D-Dr. Ali Darwiche R&D-Dr. Matthieu Moors	CEO- Kevin Brundish CTO- Dr. Unnikrishnan CFO-Vivian Smetsers Strategy-Joris Winkelmann	CTO-Norah Hornsveld	R&D- Timur Yagafarov	R&D- Miguel Rico Luengo
Comments	<ul style="list-style-type: none"> Well-established internal structure Strong focus on research and development Emphasizes both technical advancement and commercialization 	<ul style="list-style-type: none"> Experts each bringing over a decade of experience in battery technology and materials science 	<ul style="list-style-type: none"> Experts in high-performance battery research, battery architecture and materials science Emphasizes an “American startup” culture 	<ul style="list-style-type: none"> Operates under the HyET Group, sharing resources and personnel with the broader HyET Group 	<ul style="list-style-type: none"> Technical and R&D-focused team structure 	<ul style="list-style-type: none"> Experts with experience in energy storage, battery technology, and solid-state chemistry

Criteria “Product differentiation”

COMPANY	RATING	EXPLANANTION
ITEN	★★★★★	Micro battery manufacturer, Solid-mount device(SMD) SSBs. Used in low-power devices. The technology is patented.
 SOLI THOR	★★★★★	Focused on making the battery stable in broad temperature and pressure ranges and reduced separator thickness. Especially focusing on Aviation and Aerospace industry.
LIONVOLT	★★★★★	Focused on 3D SSB architecture which could lead to better performance, ba than competitors. This could be a potential long term advantage.
 HyET Lithium <small>High energy density solid-state batteries</small>	★★★	Focused on energy storage capacity and lifespan of the battery using Roll-to-roll production technique for thin film batteries. (However, other technologies also show good results).
 THE BATTERIES	★★★★	It has a patent for battery production using vacuum evaporation and high-density plasma. They are focused on increasing runtime for batteries and specific energy capacity.
 BTRY	★★★★★	Using Thin films on top of each other to make big batteries, these batteries are claimed to have very fast-charging features, long operational life-cycle, and safety (If developed, the product can have significant advantage on competitors.)

Criteria “Company Performance”



Criteria “ESG”

**HERE MORE ABOUT
THE SELECTED /
WINNING STARTUP**

Due Diligence Checklist

Categorie	Description	Check
Team and Founder	<p>Backgrounds: Do the founders and key team members have relevant experience and expertise (e.g., technical, industry, entrepreneurship)?</p> <p>Track Record: Have the founders successfully launched or been part of previous ventures or R&D projects?</p> <p>Advisors and Network: Are there experienced advisors or a strong industry network supporting the team?</p>	
Technology and Innovation	<p>Unique Value Proposition: Does the technology offer something new, innovative, or better than existing solutions?</p> <p>Intellectual Property: Are there patents or exclusive rights that protect their innovation?</p> <p>Feasibility: Can the technology be realistically developed into a viable product?</p> <p>Technology Readiness Level (TRL): At what stage is the development (proof of concept, prototype, etc.)?</p>	
Market Potential	<p>Problem-Solution Fit: Is there a clear, validated problem that the startup's technology addresses?</p> <p>Target Market: Is the target market large enough, and does the startup understand the customer needs and dynamics?</p> <p>Competitive Landscape: Who are the competitors, and what are the barriers to entry for others?</p>	
Financials	<p>Burn Rate: What is the current burn rate, and how long can they operate with their existing resources?</p> <p>Funding: How much funding have they raised so far, and what are the plans for future fundraising?</p> <p>Revenue Potential: What is the timeline for product commercialization and revenue generation?</p>	

Categorie	Description	Check
Product Development	<p>Development Timeline: Is there a realistic timeline for key milestones (prototypes, pilots, market entry)?</p> <p>Partnerships: Do they have key partners or collaborations (e.g., universities, corporates) for product development or validation?</p> <p>Regulatory Requirements: Are there any regulatory hurdles, and is the company aware of what they need to clear them?</p>	
Business Modell	<p>Revenue Model: Is there a clear business model, even if it is early stage? (e.g., licensing, sales, partnerships)</p> <p>Scalability: Can the technology scale easily across regions or markets?</p> <p>Go-to-Market Strategy: Do they have a plan to commercialize the technology?</p>	
Risk Assessment	<p>Technical Risks: Are there any significant technical challenges or limitations that could delay or prevent success?</p> <p>Market Risks: Is there uncertainty about whether the market will adopt the technology?</p> <p>Financial Risks: Are they heavily reliant on continuous fundraising?</p>	
Legal and Compliance	<p>Corporate Structure: Is the company properly incorporated with clear ownership rights?</p> <p>Contracts and Obligations: Are there any contracts (e.g., with suppliers or partners) or obligations that pose risks?</p> <p>IP Ownership: Is there clarity on who owns the intellectual property, and are there any disputes?</p>	

OPTIONAL

**SHORT DCF VALUATION FOR BETTER
INVESTMENT RECOMMENDATION**

Technology //

Lithium-Sulfur Batteries

- Li+ Anode
S_x cathode
- High energy density
Lightweight
Potentially lower cost
- Limited cycle life, polysulfide shuttle effect causing capacity loss
- Research and development with some early-stage prototypes
- Potential for use in aviation, drones, and high-energy applications within the next decade
- OXIS Energy
Sion Power

Sodium-Ion Batteries

- C / Na anode
- Abundant raw materials
Lower cost
Good safety profile
- Lower energy density compared to lithium-ion
Limited cycle life
- Pilot projects and early commercialization
- Suitable for grid storage and low-cost applications, with broader adoption expected in the next 5-10 years
- Natron Energy
Faradion

Cobalt-Free Lithium-Ion Batteries

- C/Si anode
NMA cathode
- Reduced cost
Ethical sourcing improved sustainability
- Maintaining performance and stability without cobalt
- Commercialization in progress, with several manufacturers offering cobalt-free options
- Expected to become mainstream in consumer electronics and EVs within the next 3-5 years
- Tesla
Panasonic

Iron-Air Batteries

- Fe Anode, air cathode
- Low cost
- Long-duration energy storage
- Environmentally friendly.
- Low energy density
- Slow charge/discharge rates
- Research and pilot projects
- Ideal for grid storage and renewable energy integration, with potential adoption in the next 5-10 years
- Form Energy
ESS Inc.

Zinc-Based Batteries

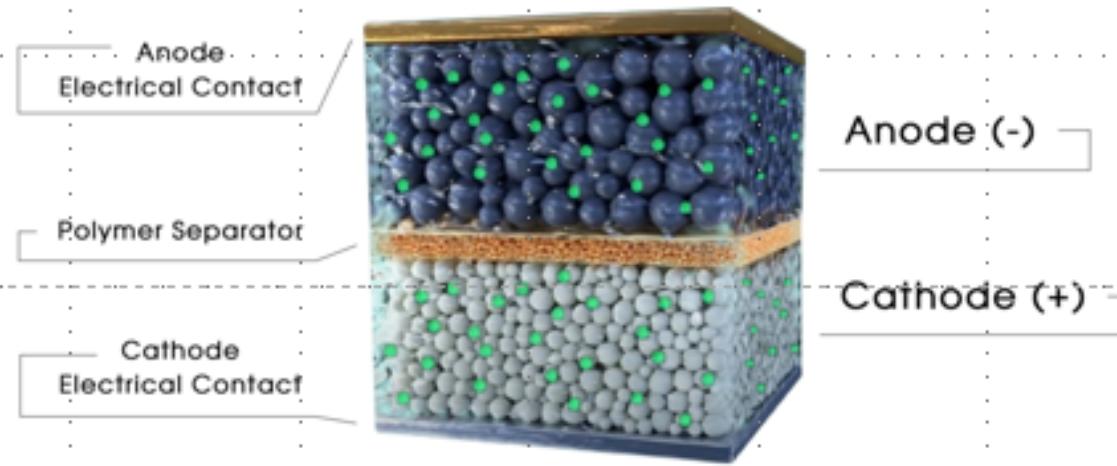
- Zn Anode
- Safe
- Environmentally friendly
- Cost-effective
- Limited energy density
- Dendrite formation in some designs
- Commercialization for specific applications like hearing aids and grid storage
- Broader adoption expected in small and large-scale applications within 5-10 years
- Zinc8 Energy Solutions
Eos Energy Enterprises

Solid-State Batteries

- Solid electrolyte (ceramic, glass, or polymer) with a solid separator integrated with the electrolyte
- Higher energy density
- Improved safety
- Longer lifespan
- Manufacturing complexity
- High cost
- Scalability issues
- Early commercial stage with ongoing research and pilot projects
- Expected to see wider adoption in electric vehicles (EVs) and portable electronics within the next 5-10 years
- TOYOTA
QuantumScape

Solid-state batteries, with their enhanced safety, higher energy density, faster charging, and longer lifespan, are a prime investment opportunity // include trends

Lithium-Ion Batteries



REVOLUTIONARY

Batteries that use solid electrolytes instead of liquid ones. Offer higher energy density and improved safety.

Improved Safety: Non-flammable solid electrolytes reduce the risk of fires and explosions.

Higher Energy Density: Potential to store more energy in a smaller space, ideal for electric vehicles (EVs).

Faster Charging Times: Can charge more quickly than traditional lithium-ion batteries.

Longer Lifespan: More durable and can withstand more charge cycles.

Major Players: Companies like Toyota, Volkswagen, and startups like [LionVolt](#) are leading the charge.

Recent Breakthroughs: Advances in electrolyte composition and battery architecture.

Strategic Importance: Key for the EV industry and beyond, with significant investments from China, Japan, and South Korea.

Why Invest Now?

- **Growing Market Demand:** Increasing need for safer, more efficient batteries in EVs and portable electronics.
- **Technological Innovations:** Continuous advancements are making solid-state batteries more viable for mass production.
- **Environmental Impact:** Solid-state batteries are more environmentally friendly, aligning with global sustainability goals.

Criterias selected

Who run the class ?

Development Stage	Funding	Partnerships %	Structure	Product Differentiation	Landscape	ESG
ITEN						
 SOLITHOR						
 LIONVOLT						
 HyET Lithium <small>High energy density solid-state batteries</small>						
 THE BATTERIES						
 BTRY						

Material Sourcing

SAVANNAH
FACILITAR A TRANSIÇÃO ENERGÉTICA DA EUROPA

We create chemistry

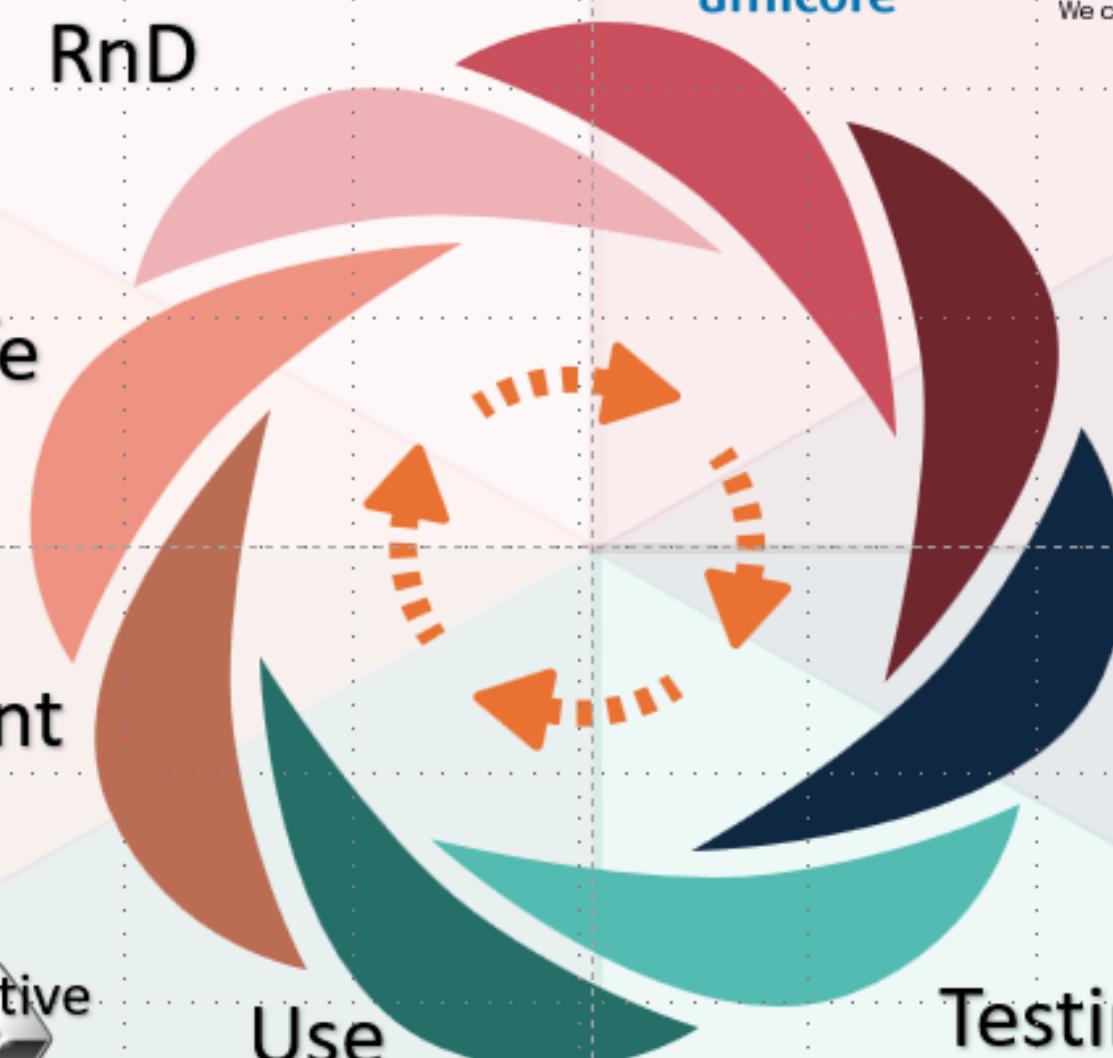
We create chemistry

Component manufacture

Assembly

Testing

Total Quality. Assured.




AHEAD OF WHAT'S POSSIBLE™

Application

Automotive



DAIMLER

Consumer Electronics

NOKIA SIEMENS

Energy storage

enel



Hardware/Component manufacturers

BlueSolutions
BOLLORE

Solid Power

elringklinger

umicore



saFT

umicore



REDUX

BatteriRetur

RnD

Fraunhofer

cea liten

imec

HIU
HELMHOLTZ
INSTITUTE
ULM

Electrochemical Energy Storage

SINTEF

Start-ups & Innovators

ProLogium

BlueSolutions
BOLLORE

Solid Power

Ilka

northvolt®

Collaborations/Alliances

ACC SOLiD

AUTOMOTIVE CELLS Co

EUROPEAN
ALLIANCE

BATTERY
2030+

Gigafactory ProLogium

Application

Government and funding agencies

horizon
europe

eit InnoEnergy

European
Investment Bank

European
Commission

Co-funded by the
European Union



MUSKAAN

- [HTTPS://FARADAY.AC.UK/WP-CONTENT/UPLOADS/2020/04/FARADAY-INSIGHTS-5_UPDATED.PDF](https://FARADAY.AC.UK/WP-CONTENT/UPLOADS/2020/04/FARADAY-INSIGHTS-5_UPDATED.PDF)
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- [HTTPS://TECHCRUNCH.COM/2022/05/05/BATTERIES-HAVE-BECOME-VC-AND-PES-MOST-ELECTRIC-INVESTMENT-OPPORTUNITY/](https://TECHCRUNCH.COM/2022/05/05/BATTERIES-HAVE-BECOME-VC-AND-PES-MOST-ELECTRIC-INVESTMENT-OPPORTUNITY/)
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- [HTTPS://WWW.FRAUNHOFER.DE/](https://WWW.FRAUNHOFER.DE/)
- [HTTPS://WWW.EBA250.COM/](https://WWW.EBA250.COM/)
- [HTTPS://WWW.UL.COM/NEWS/UNDERWRITERS-LABORATORIES-EXPANDS-ITS-EUROPEAN-TESTING-CAPABILITIES](https://WWW.UL.COM/NEWS/UNDERWRITERS-LABORATORIES-EXPANDS-ITS-EUROPEAN-TESTING-CAPABILITIES)
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Thank You