

BATTERY 2030⁺

Inventing the sustainable batteries of the future



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April 15th 2020 – Web Meeting

The National & European Battery Innovation Landscape - Norway

What is Battery 2030+ ?

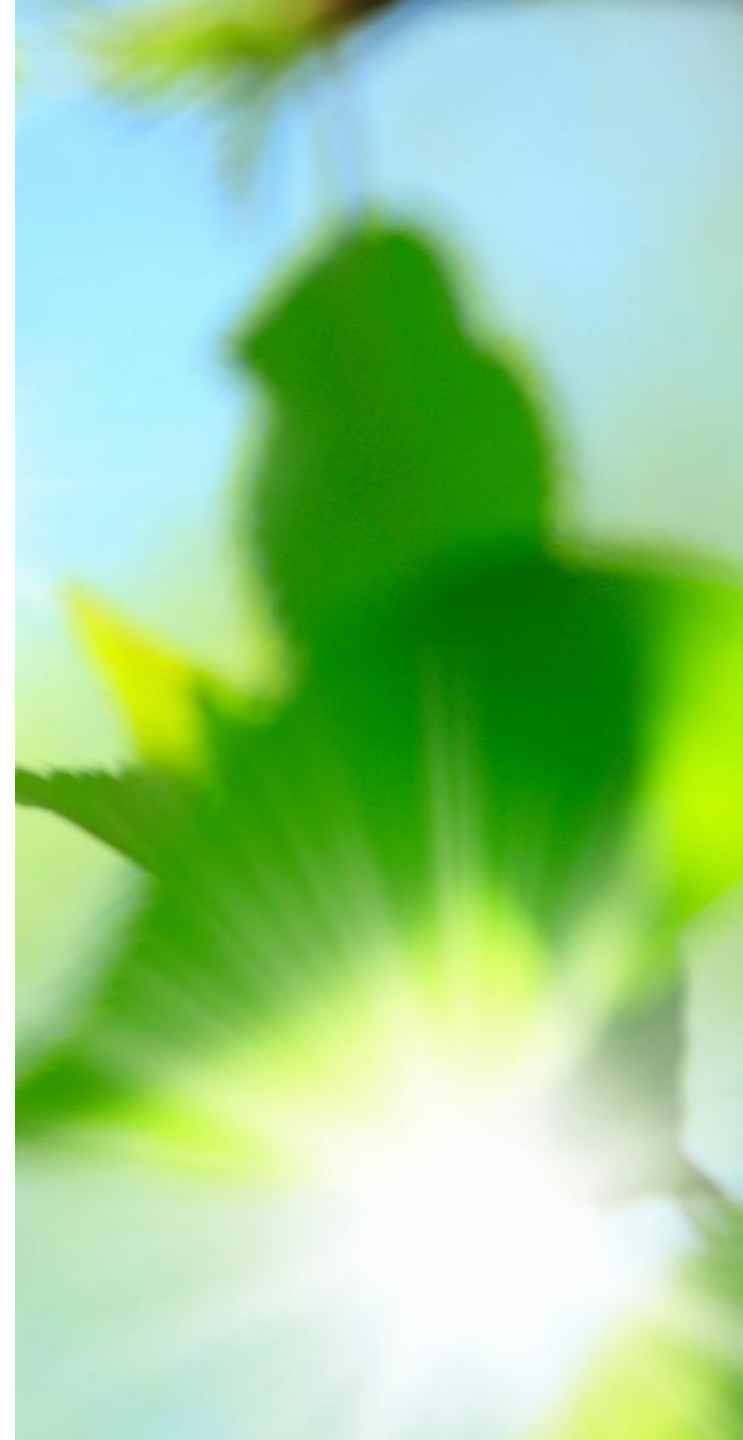
- BATTERY 2030+ is the large-scale and long-term European research initiative with the vision of inventing the sustainable batteries of the future, to enable Europe to reach the goals of a climate-neutral society envisaged in the European Green Deal.
- **BATTERY 2030+ brings research institutions and industry together to develop the next generation of ultra-performing, sustainable and safe batteries.**
- Launched in March 2019 and is currently supported by a Horizon 2020 Coordination and Support Action (CSA) and three open R&I calls with a total budget of €42 M that closed January 2020



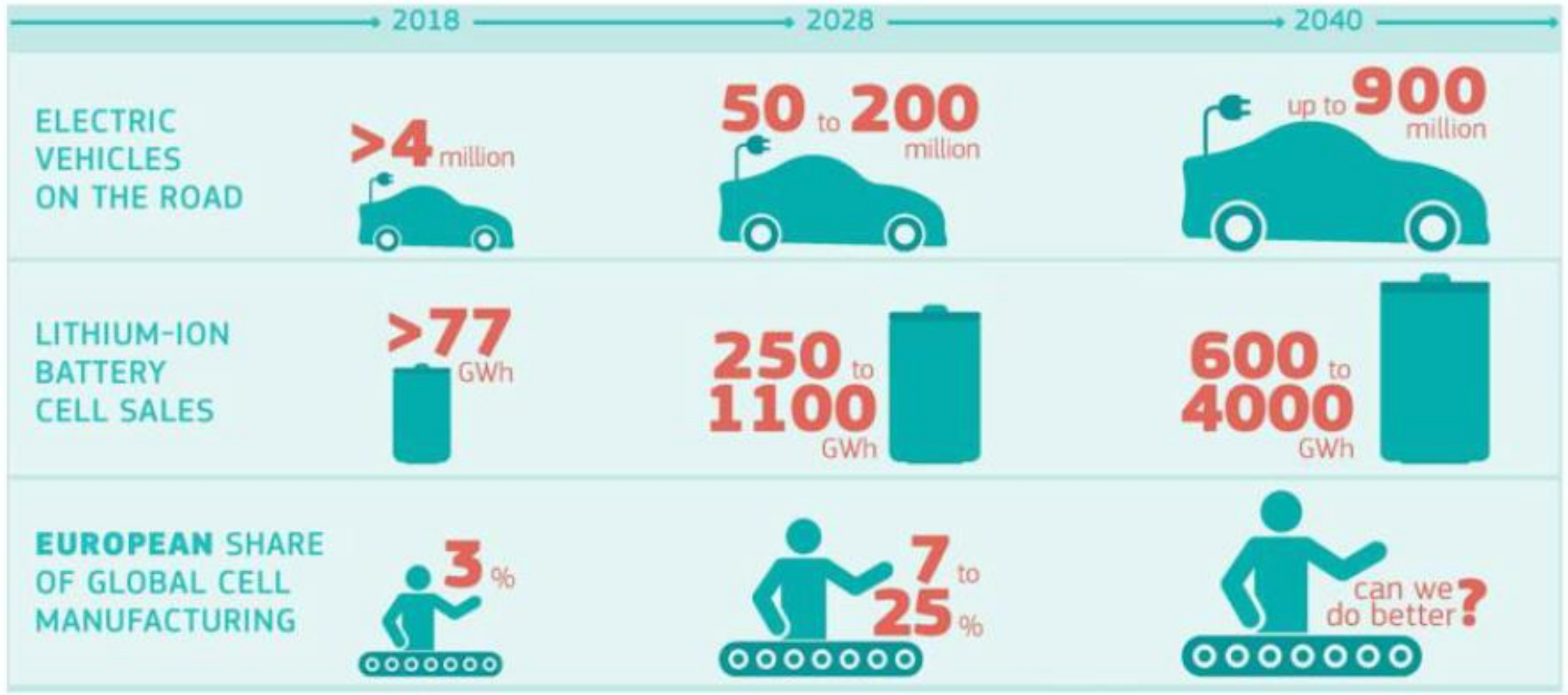
The aims

The BATTERY 2030+ aims are:

- to invent ultra-high performance batteries that are safe, affordable, and sustainable, with a long lifetime
- to provide new tools and breakthrough technologies to the European battery industry throughout the value chain
- to enable long-term European leadership in both existing markets (e.g., transport and stationary storage) and future emerging sectors (e.g., robotics, aerospace, medical devices, and Internet of things)



Why are we doing this?



Why are we doing this?

- Batteries are a **key enabling technology** to achieve a climate-neutral society.
- The Strategic Action Plan on Batteries, published in May 2018 by the EC, calls for an ambitious, large-scale and long-term research programme on batteries.

Answering this call, the BATTERY 2030+ consortium have joined forces to create a long-term visionary research initiative for future battery technologies.



BATTERY 2030

Core partners



HELMHOLTZ-INSTITUT
MÜNSTER



WWU
MÜNSTER



VRIJE UNIVERSITEIT
BRUSSEL



UPPSALA
UNIVERSITET

DTU



KEMIJSKI INŠTITUT



POLITECNICO
DI TORINO





The Roadmap

- Launched in March 2020.
- Suggests research actions that will radically transform the way we discover, develop and design ultra-high-performance, durable, safe, sustainable, and affordable batteries.
- A collective European research effort to support the urgent need to establish European battery cell manufacturing.

<https://www.battery2030.eu/>



BATTERY 2030+ suggests three overarching themes encompassing six research areas

I) Accelerated discovery of battery interfaces and materials

- Battery Interface Genome (BIG)
- Materials Acceleration Platform (MAP)

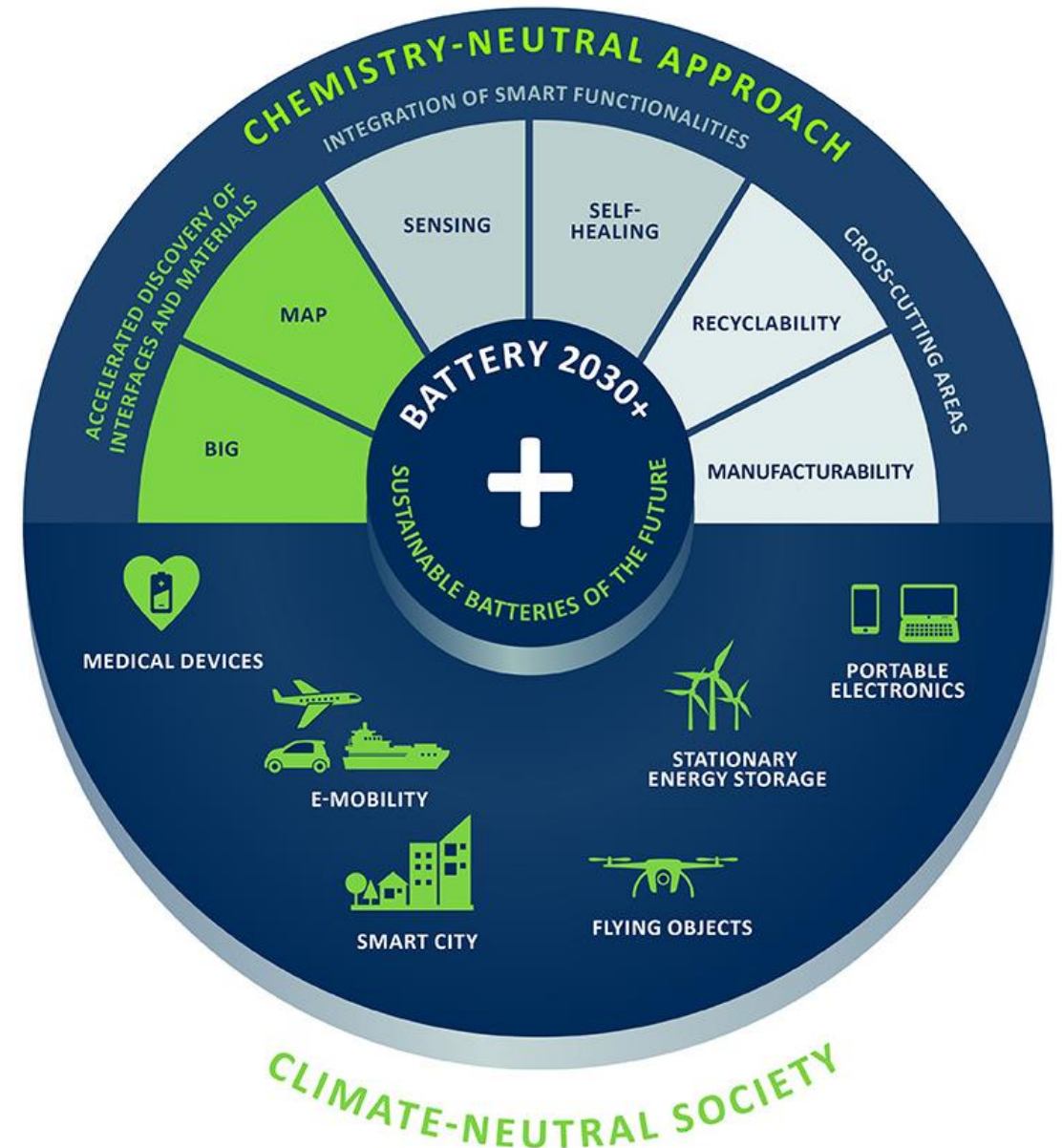
II) Integration of smart functionalities

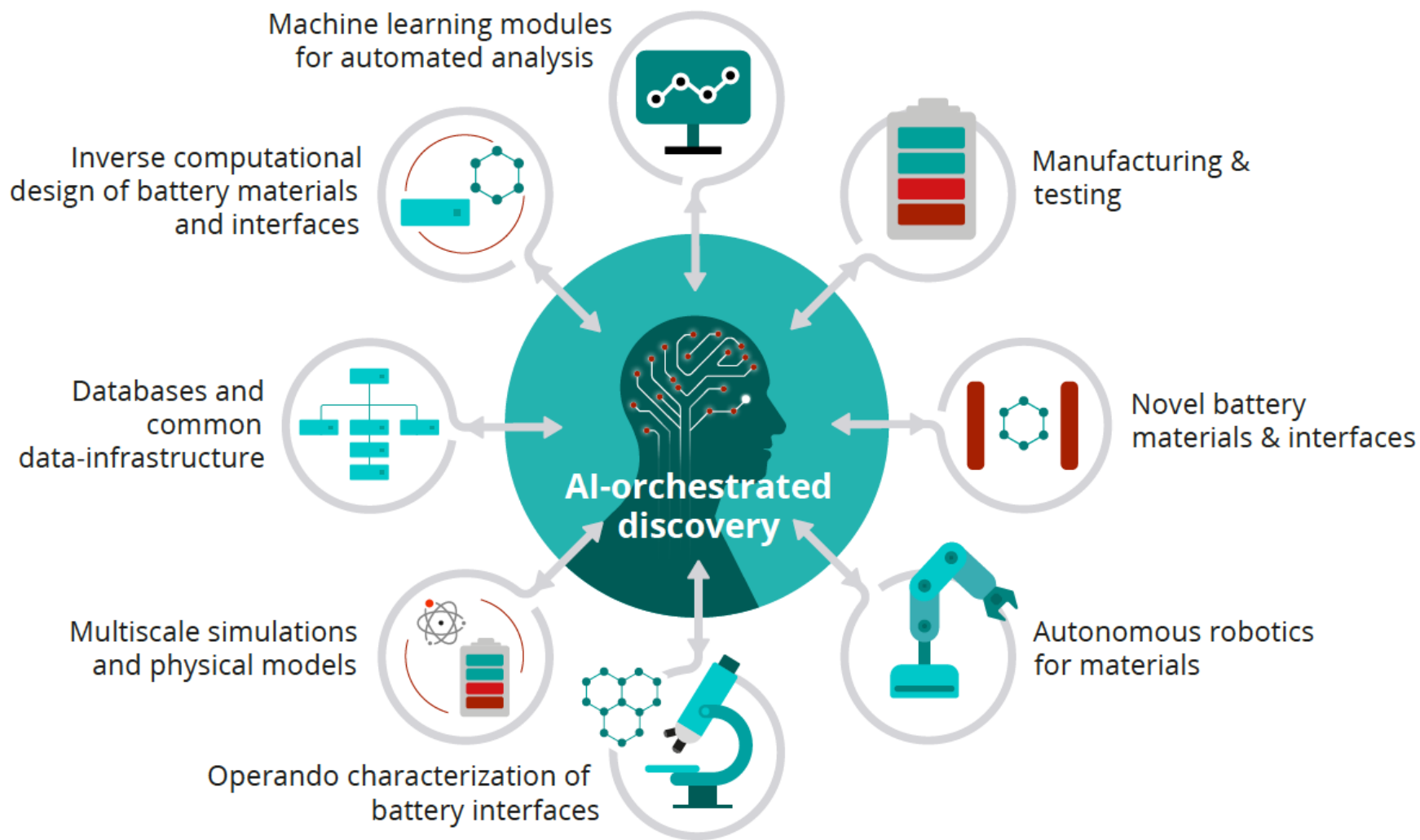
- Sensing
- Self-healing

III) Cross-cutting areas

- Manufacturability
- Recyclability

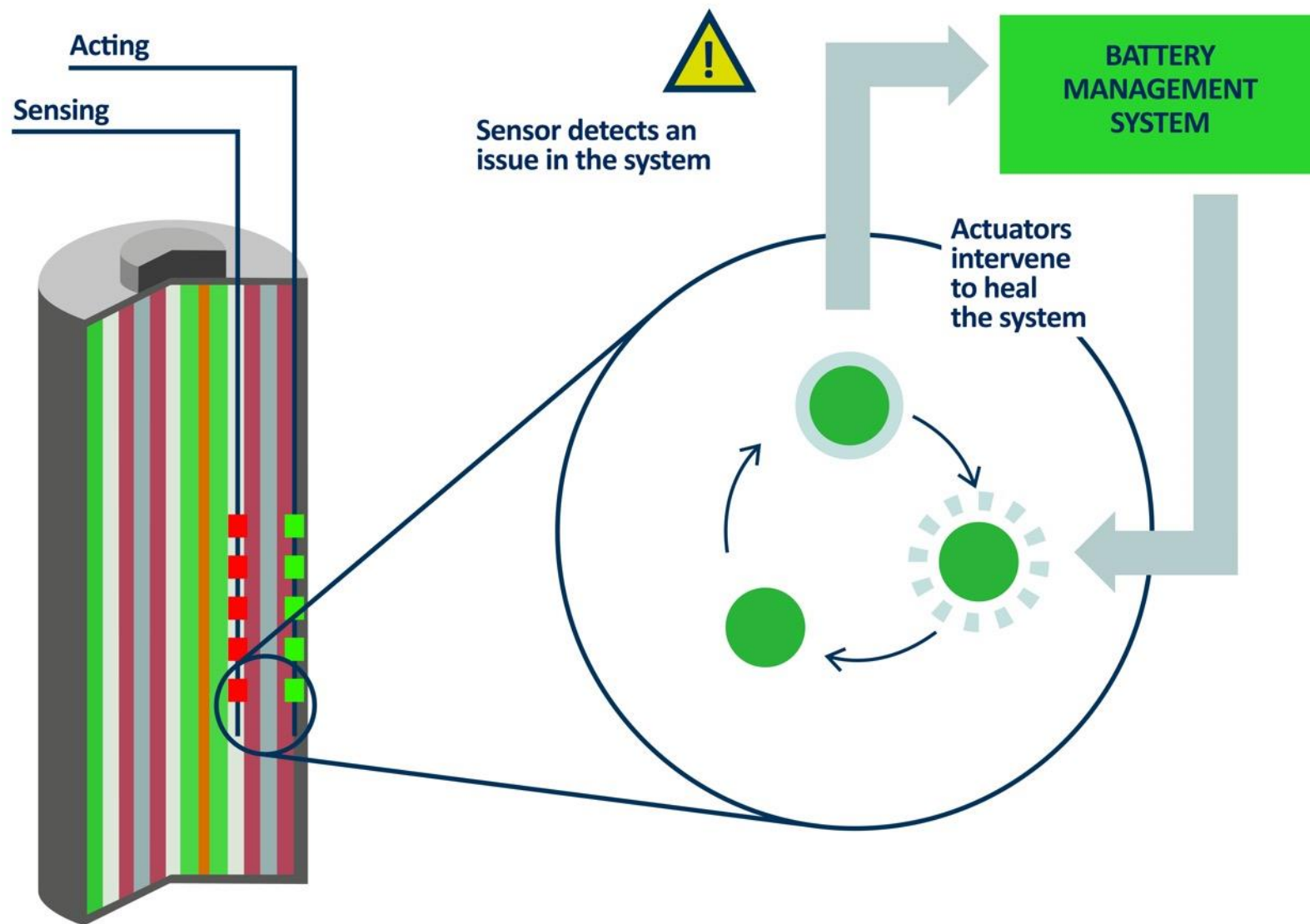
A chemistry neutral approach





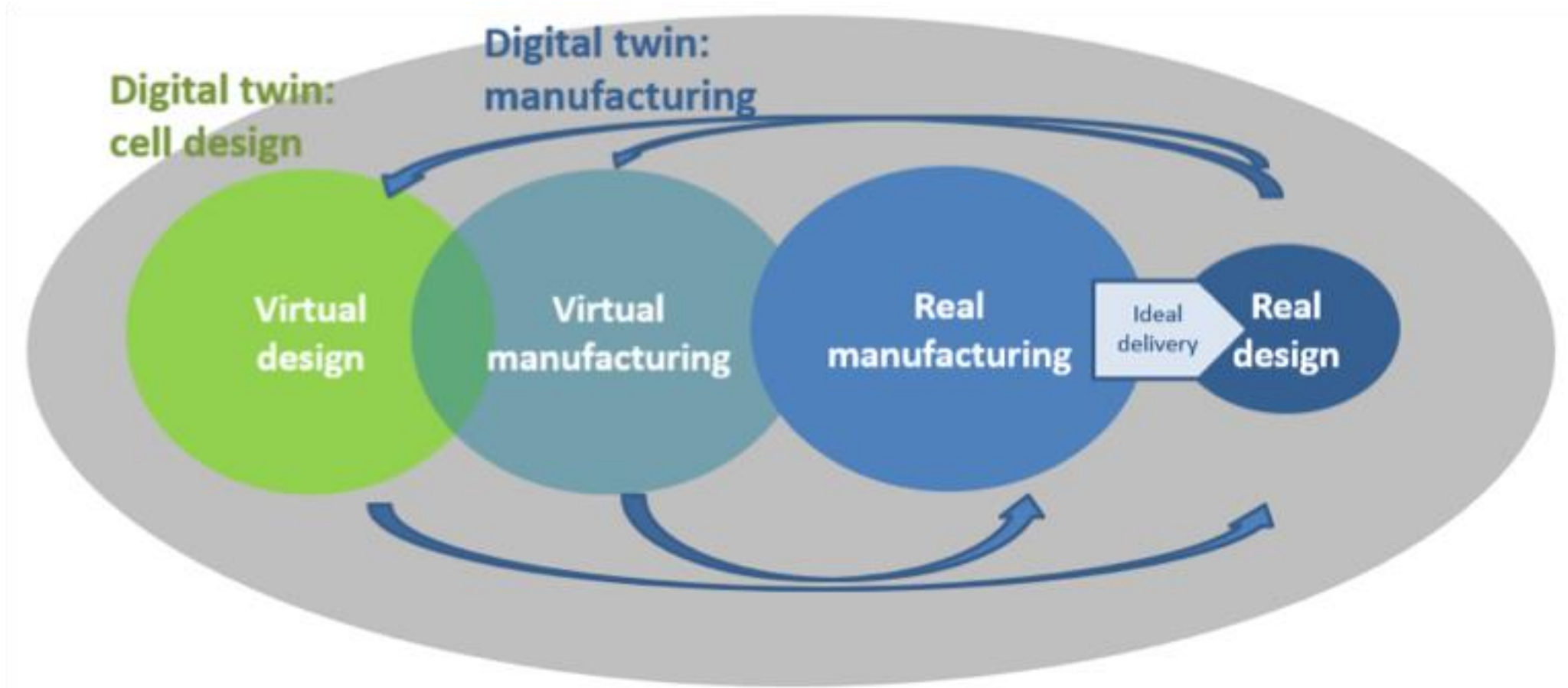
- **Materials Acceleration Platform (MAP)** to reinvent the way we research battery materials research today.
- By combining powerful approaches from high-throughput automated synthesis and characterization, materials and interface simulations, autonomous data analysis and data mining, as well as AI and machine learning.
- Building on MAP, BATTERY 2030+ proposes to develop a **Battery Interface Genome (BIG)** that will establish a new basis for understanding the interfacial processes that govern the operation and functioning of every battery.
- Development of a shared European data infrastructure.
- Integrating BIG and MAP will transform the way we understand and discover new battery materials.

Sensing and self-healing

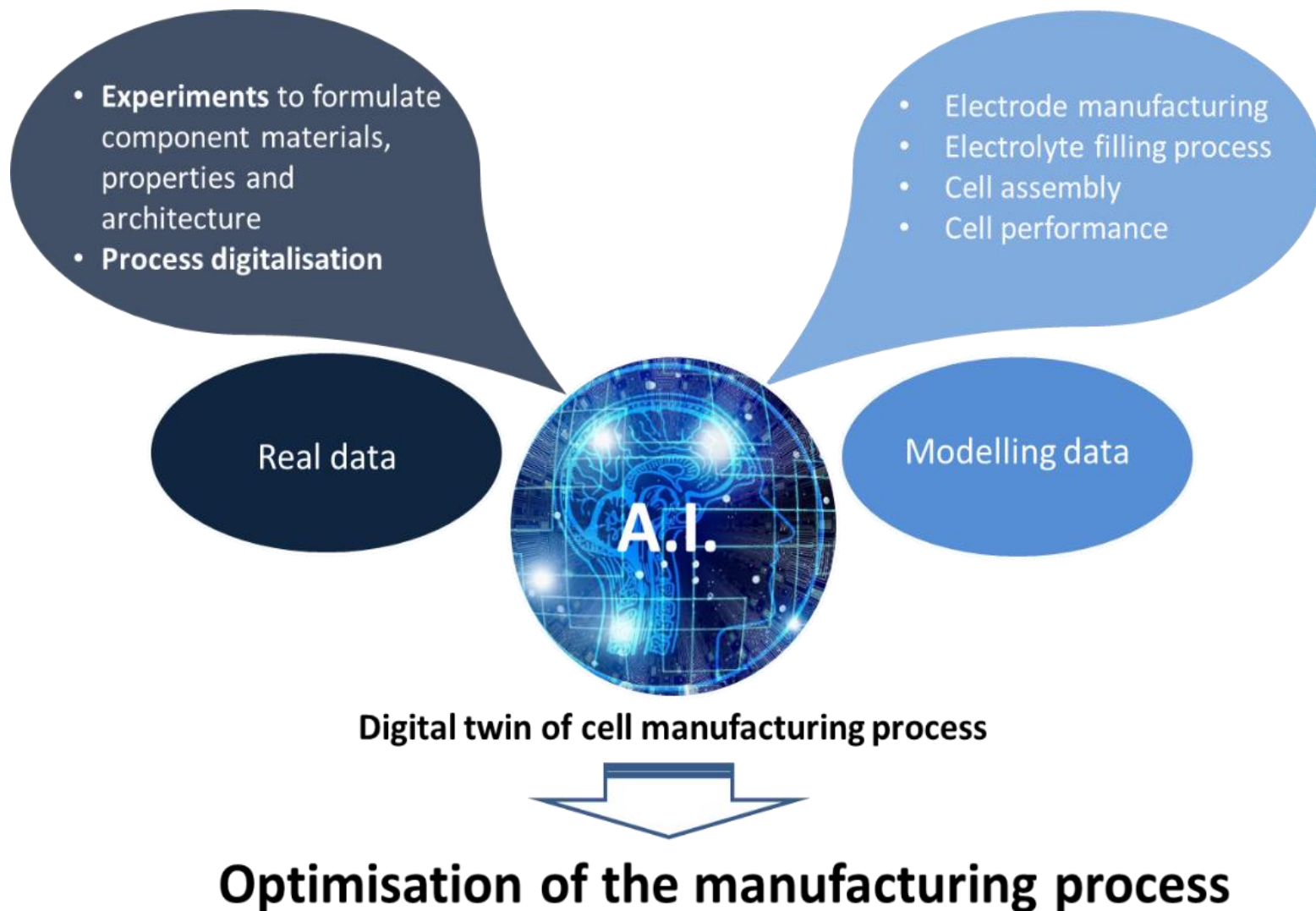


Sensing and self-healing

- The BATTERY 2030+ vision is to incorporate smart **sensing** and **self-healing** into battery cells to increasing battery durability, enhancing lifetime, lowering the cost per kWh stored and significantly reducing the environmental footprint.
- Non-invasive sensing technologies will be developed to monitor key battery cell parameters during operation and determine defective areas or components within cells that need to be repaired by activating/adding self-healing functions.
- Self-healing functionalities will become an important property of future batteries in applications that require batteries with high reliability, high quality, and long lifetimes.

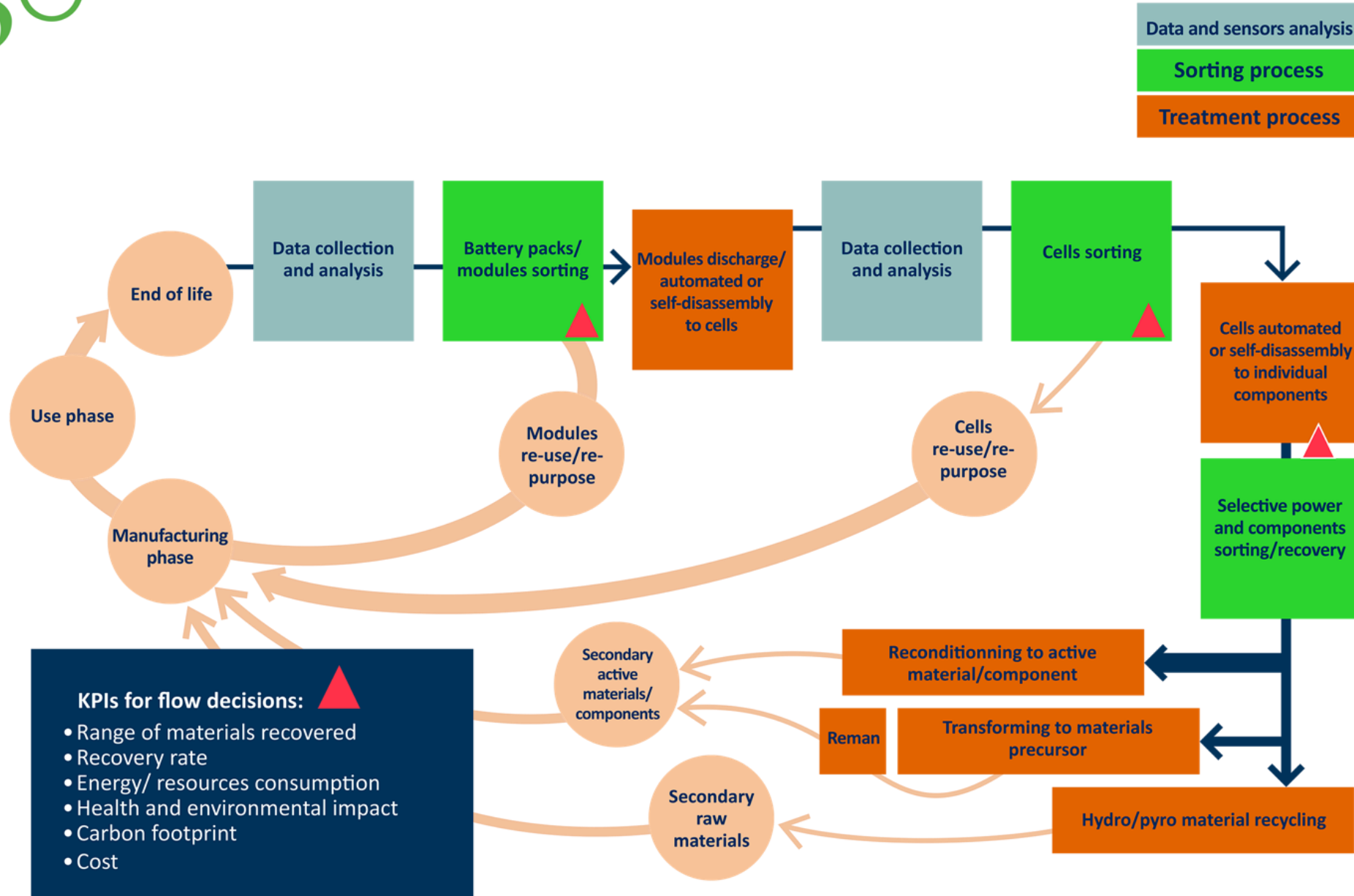


Manufacturability



- The redesign of the battery cell architecture is essential to drive competitiveness and sustainability, while maintaining or even increasing the energy density.
- Modelling and the use of AI will be exploited to deliver “digital twins” for both innovative cell designs, substantially minimising classical trial-and-error approaches, and developing new manufacturing methodologies.
- The main goal of the digital twin model, designed for cell manufacturing processes, is to resolve physical issues faster by detecting them earlier in the process, and to predict outcomes with a much higher degree of accuracy.

Recyclability: Future recycling process



- The development of battery dismantling and recycling technologies is essential to ensure the long-term sustainability of the battery economy by 2030.
- This calls for new, innovative, simple, and low-cost processes targeting a very high recycling rate, small carbon footprint, economic viability, as well as logistics and business incentives.
- One technical approach will be the direct recovery of the active materials and single, instead of multistep recovery processes.
- BATTERY 2030+ calls for new recycling concepts, such as reconditioning or reusing electrodes.

- BATTERY 2030+ is already laying the scientific and technological foundation to provide the tools to enable the next generation of high-performance, safe, and sustainable batteries in Europe.
- The integrated large-scale collaborative approach creates strong synergies for Europe putting our R&D resources to their best use thus accelerate innovations.
- A large-scale initiative attracts the talent and competences necessary to achieve the technical goals and to support European industry with a skilled workforce.



BATTERY 2030

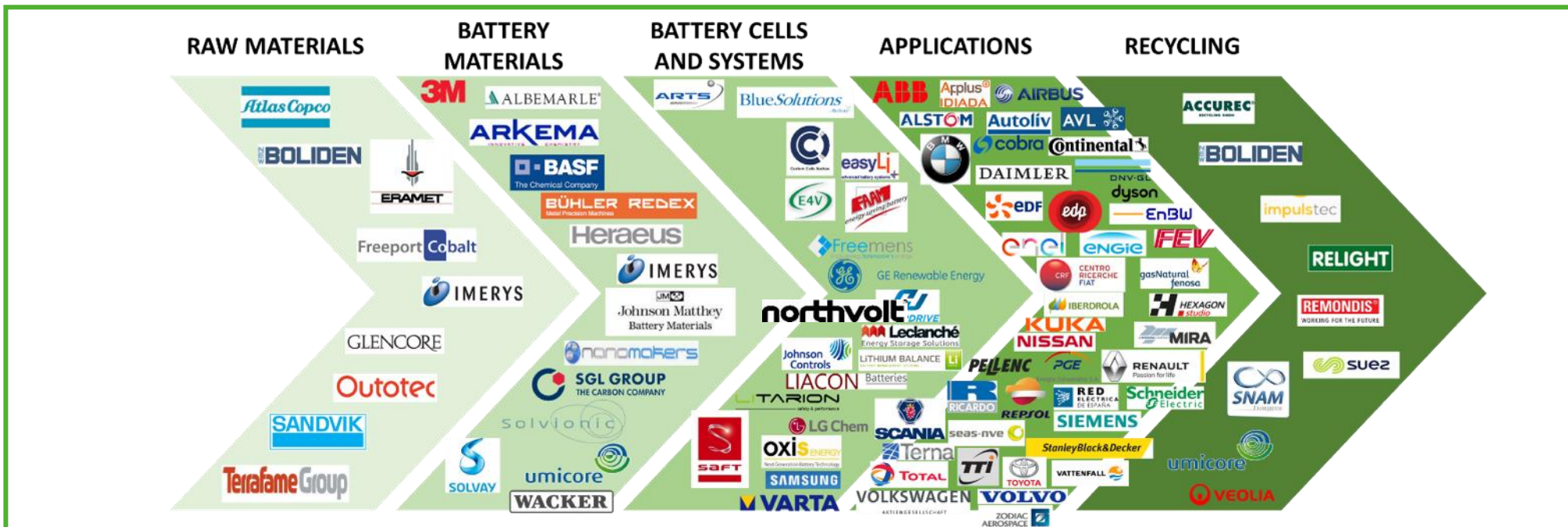
Core group



Supporting organizations



Industry (90+ companies belonging to the core or supporting organizations)



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