European Commission

Journée d'information et de réseautage

dédiée aux batteries du futur

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Future Battery Technologies

a large-scale FET initiative on future battery technologies

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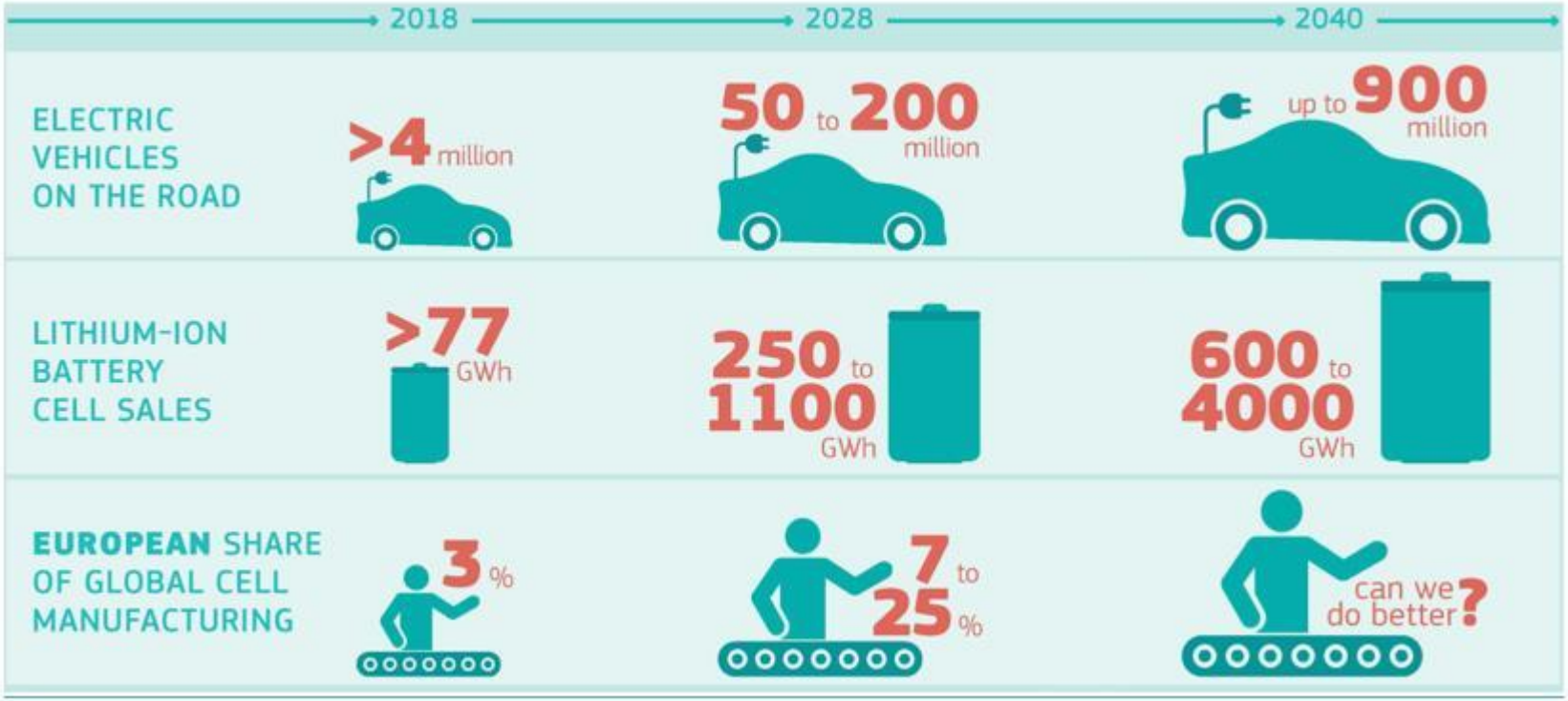
Why batteries are important?

- Mobility and energy are strategic sectors & industry for Europe
- Batteries essential for clean mobility and renewable energy storage
- Fast growing market: 250 B€ by 2025, 40% value of electric vehicle
- New battery technologies necessary to match market demand
- Europe has many assets to come back in a market dominated by Asia



Global supply and demand of Li-ion batteries and the European share in manufacturing. Source: JRC

High priority on EU agenda

- Energy Union Framework Strategy, COM (2015) 80
- Integrated Strategic Energy Technologies Plan (SET-Plan) COM(2015) 6317: Action 7
  - *'Become competitive in the global battery sector to drive e-mobility forward'*
  - SET-Implementation Plan (Nov. 2017)
- Launch of EU Battery Alliance (October 2017)
- Strategic Action Plan on Batteries (May 2018)

A coordinated response to EU challenges

- **Accelerate battery manufacturing and capacity deployment in EU**
- **Supportive framework : ecosystem, finance, regulations, standards..**
- **Strengthen research on advanced battery technologies**
  - DG R&I : Next generations of battery technologies and systems for mobility and energy storage
  - FET : Focus on long-term research and disruptive approaches

Why a large-scale FET initiative?

- Accelerate emergence of breakthrough battery technologies
- Mobilise EU effort around an ambitious vision and long term research agenda
- Leapfrog short-medium term incremental research effort
- Provide a competitive advantage to EU industry in a strategic market
- Building up European knowledge and long term industrial leadership
- Complement effort on building cell manufacturing capacities and know-how

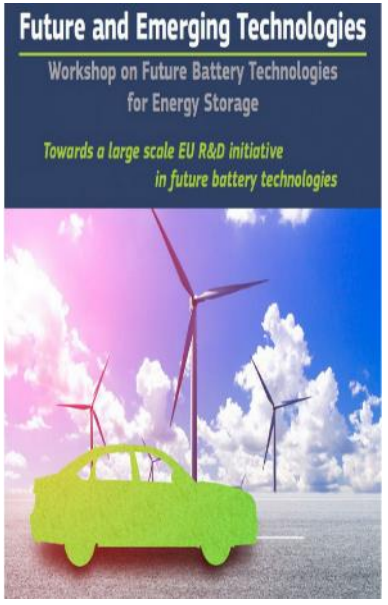
Started with FET Workshop January 2018

https://ec.europa.eu/digital-single-market/en/news/workshop-future-battery-technologies-energy-storage

T. Skordas and C. de la Torre blogpost

"*Towards the next generation of batteries "made in the EU"*

https://ec.europa.eu/digital-single-market/en/blogposts/towards-next-generation-batteries-made-eu



Preparing the initiative

Work in progress

- First workshop: January 10th, 2018 (Brussels)
- Second workshop: October 29th, 2018 (Vienna)
- First 'Vision document': November 9th, 2018
- 'Battery 2030+ Manifesto': December 2018
  http://battery2030.eu/
- Launch Battery 2030+ CSA : March 2019
  - one year preparatory action
  - engage with stakeholders
  - preparing a detailed research roadmap

Battery2030+
Core group leading the preparation

Stakeholders support

Core group

Supporting organizations

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

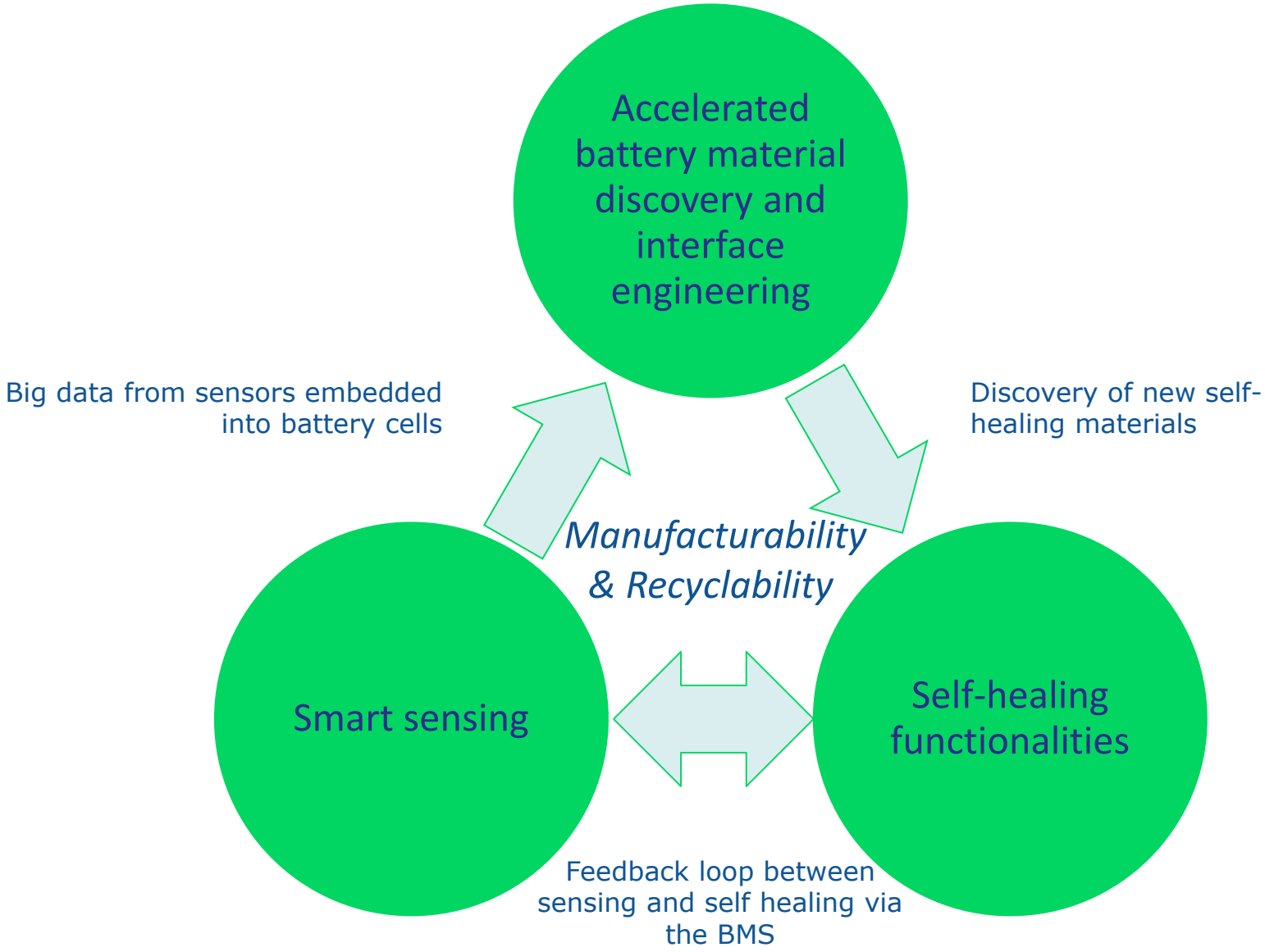
Inventing the batteries of the future

- Ultrahigh performance, smart & sustainable battery for e-mobility, stationary storage and many others applications

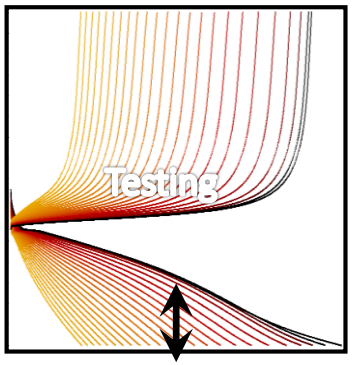
- ✓ High energy density
- ✓ Outstanding lifetime
- ✓ Fast charging
- ✓ Reliable
- ✓ Safe
- ✓ Smart
- ✓ Sustainable
- ✓ Affordable
- ✓ Second life usage
- ✓ Easy recycling

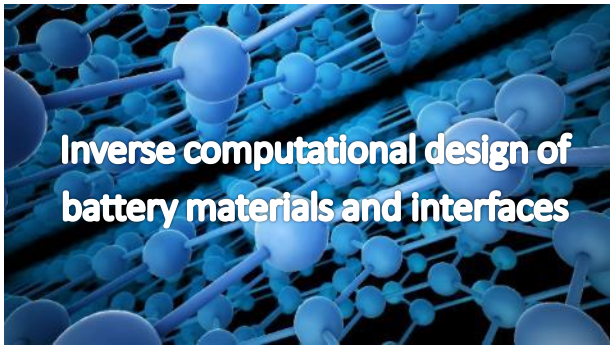
- ✓ Targeting breakthrough technologies, leveraging digital advances and adopting integrative approach across the value chain
- ✓ Exploiting the untapped potential of novel, affordable and sustainable materials, chemistries, smart functionalities, and cell designs

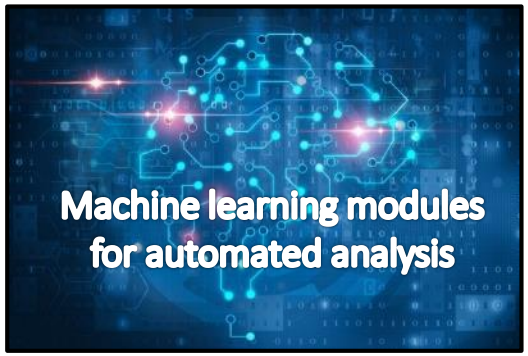
Main research areas (so far!)

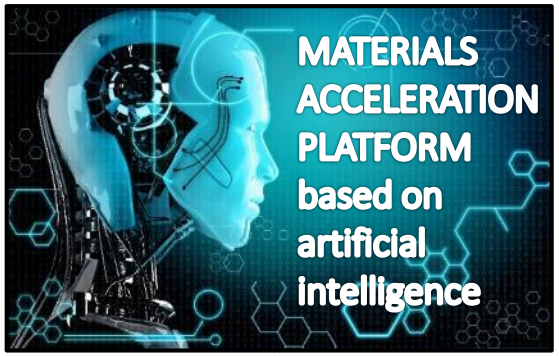


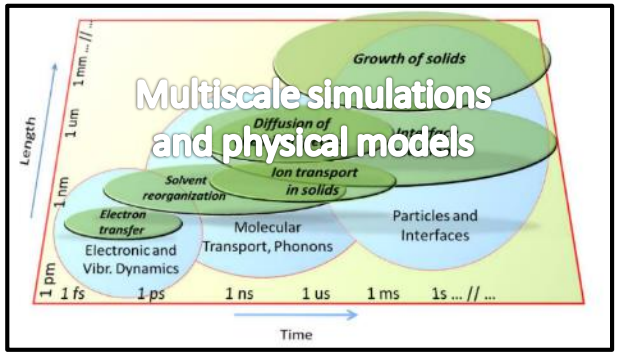
Accelerated battery material discovery and interfaces engineering

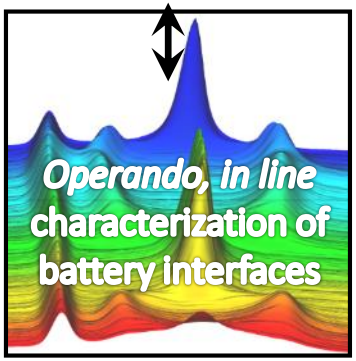


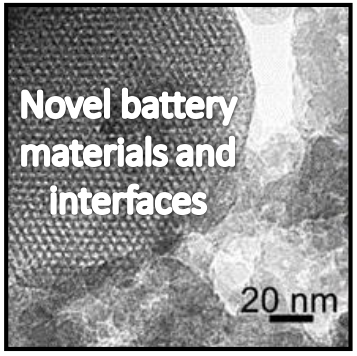












Accelerated battery material discovery and interfaces engineering

MATERIALS ACCELERATION PLATFORM
Self-driving laboratory for autonomous discovery and optimization of materials and interfaces

10× acceleration of the development cycle

Energy & power densities approaching the theoretical limits

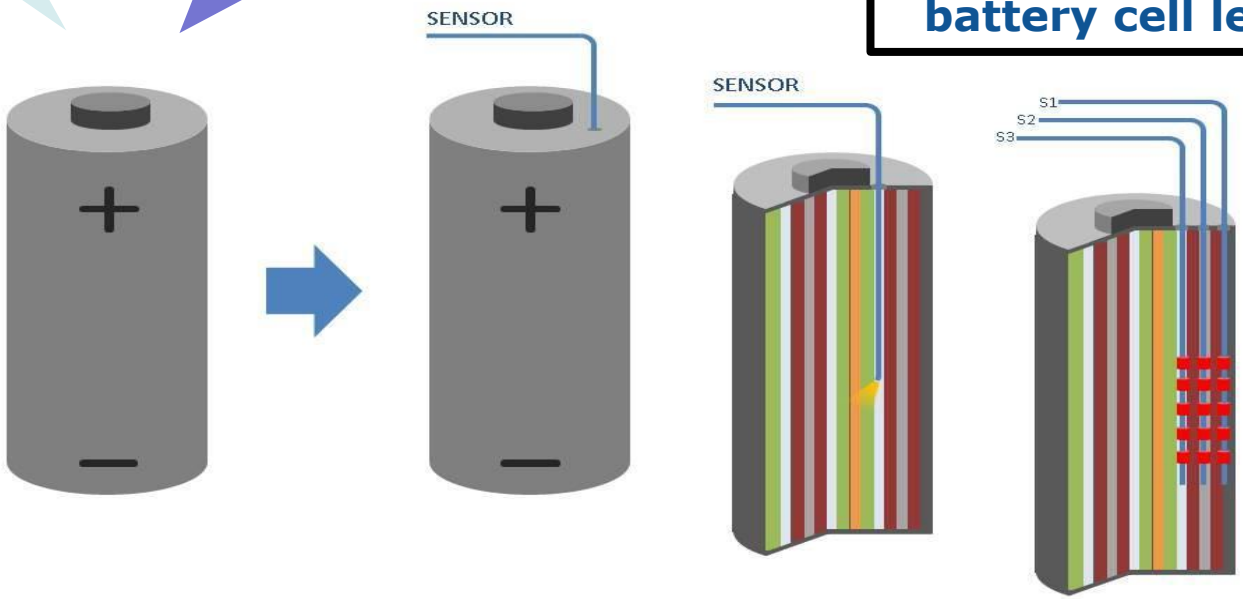
Outstanding lifetime & reliability

Smart sensing

E, i, R

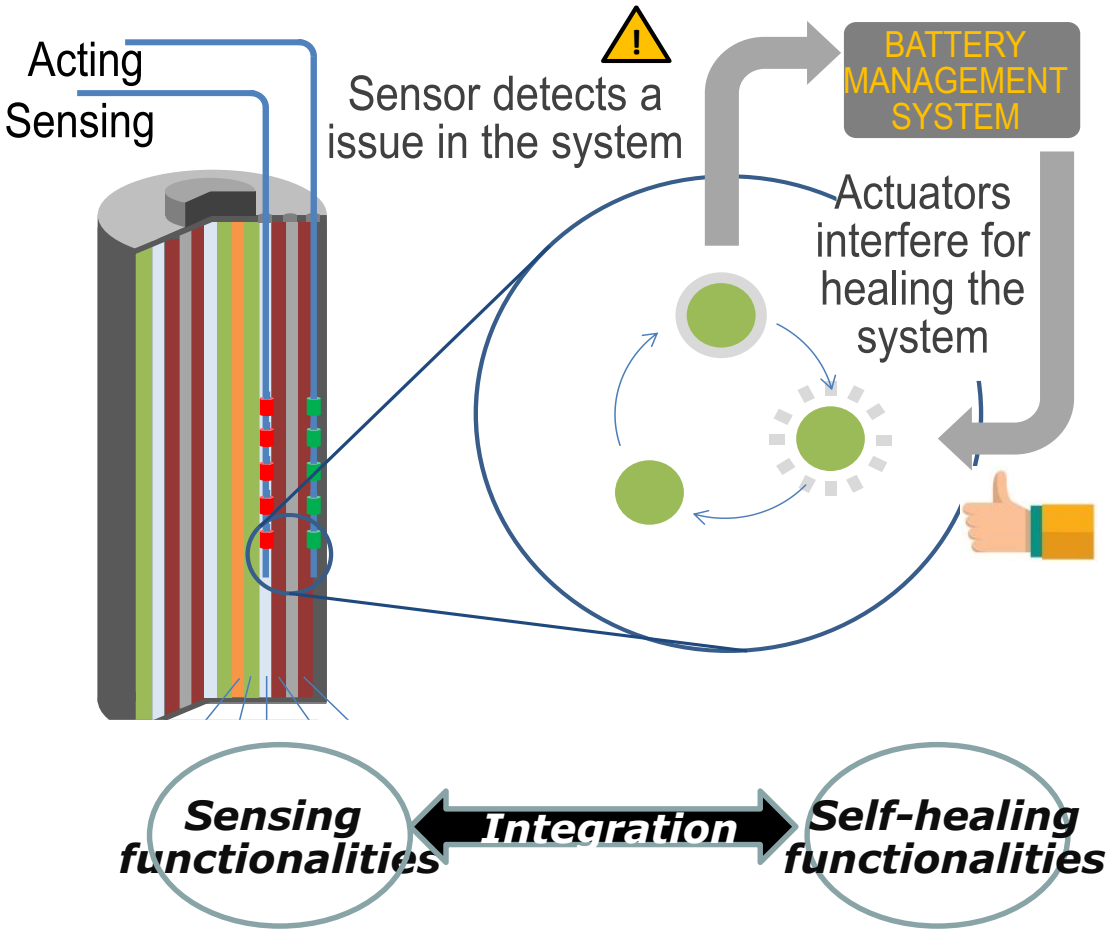
What else? | T | ε | σ | [x] | S EI | PERCOLATION

SMART SENSING
Spatially and time resolved sensing down to the battery cell level



- Outstanding lifetime and reliability
- Enhanced safety
- Environmental sustainability (second life)

Self-healing functionalities

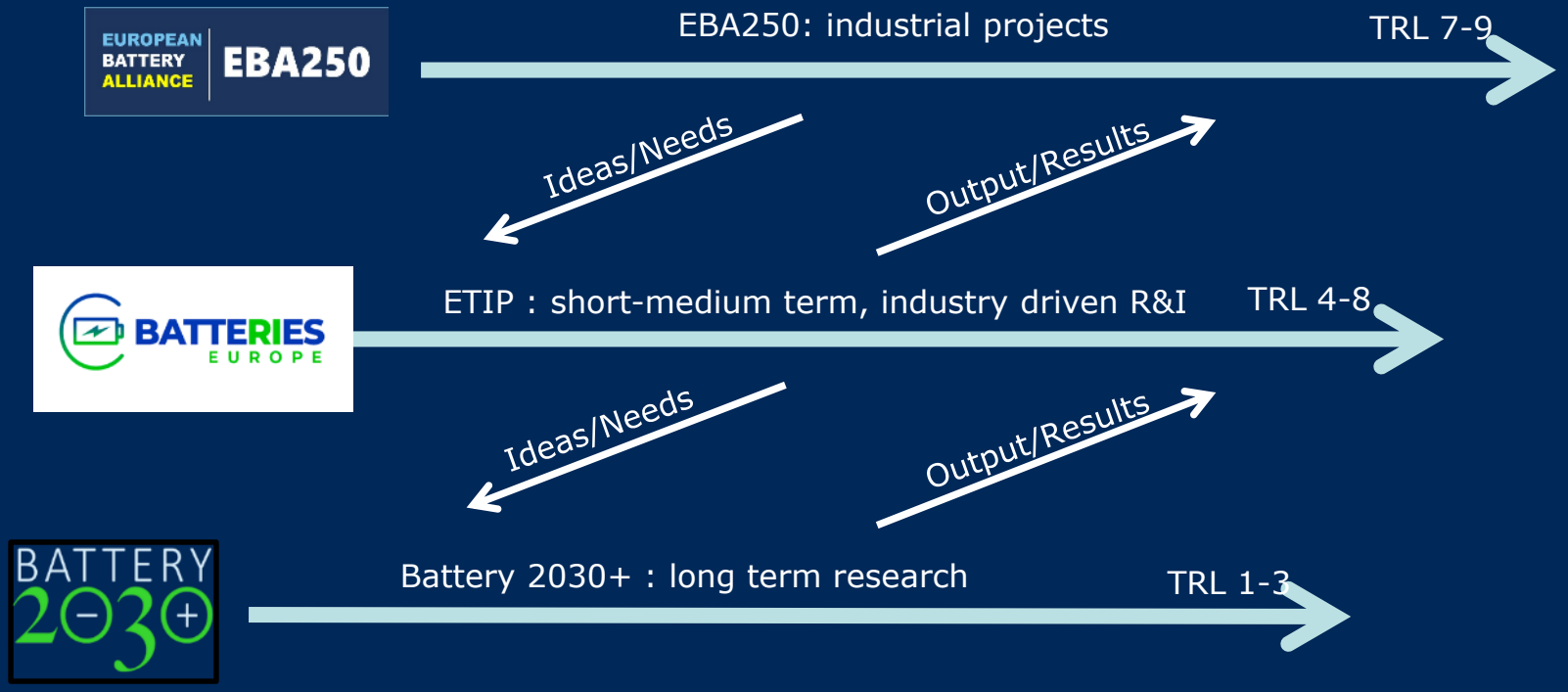


Positioning in the R&I landscape

TRL 1 TRL 2 TRL 3 TRL 4 TRL 5 TRL 6 TRL 7 TRL 8 TRL 9

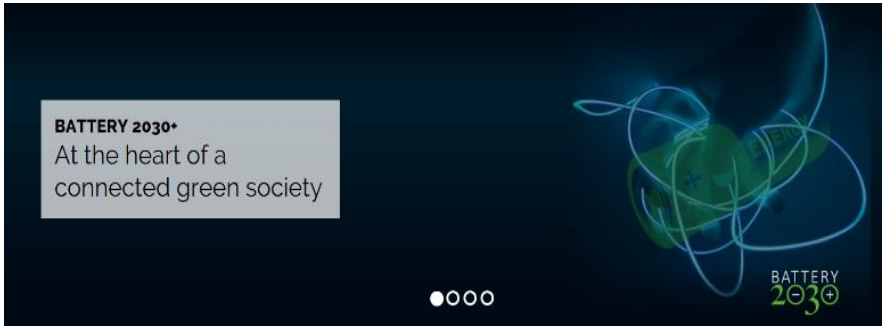
Scope	Long-term research	Short-to-medium term research	Industrialization
Actors	Driven by European research community	EERA, ALISTORE, EGVI, EMIRI, EUROBAT, RECHARGE, earpa, CLEPA, eucar, EASE, eit European Institute of Innovation & Technology, ...	European Battery Alliance
Roadmap	To be developed in 2019 from the Manifesto	SET-Plan	Industrial roadmaps
	BATTERY 2030+	BATTERIES EUROPE	EUROPEAN BATTERY ALLIANCE EBA250

European Stakeholder Networks



Join Batteries Europe network ! Call open till 16th of June 2019
'One-stop shop for the battery-related R&I ecosystem to prioritise R&I needs for the whole battery value chain in Europe.'
https://www.eba250.com/battriees-europe-launches-call-for-experts/

Get engaged with Battery 2030+



Preparing the initiative

- **Endorse Battery 2030 + Manifesto**

http://battery2030.eu/

- **Engage with Battery 2030 + CSA consultation of stakeholders**
- **Contribute to detailed research roadmap**

Horizon 2020 - Kick start of first R&I activities

- **Call for first R&I projects in Work Programme 2020 (07/2019)**
- **Call for ERANET (07/2019)**
- **Expected start of first R&I projects (mid-2020)**

Horizon Europe

(Under discussion, public consultation on Strategic plan to come)

‘Battery 2030 CSA’ timeline

Objectives:

- *Develop in cooperation with the research community the S&T roadmap of a 10-year cross disciplinary research initiative*
- *Propose R&I actions & funding schemes*
- *Get support from key stakeholders and EU Member States*

M1
Start 1st of March 2019
Kick-off 26th of March

M1-M4
March-June 2019
State of the art

M5-M6
July-August 2019
First Draft Roadmap / Bi-lateral consultation

M8
October 2019
Second Draft Roadmap

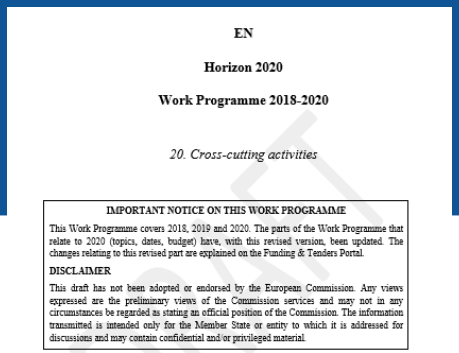
M9
Nov. 2019
Consultation Workshop

M12
Feb. 2020
Final Roadmap

Battery 2030+ Manifesto
http://battery2030.eu

- *Coordinated by Uppsala University (SE)*
- *17 partners from 9 countries*
  https://www.battery2030.eu/

Work Programme 2020 (draft)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Horizon 2020

Work Programme 2018-2020

20. Cross-cutting activities

IMPORTANT NOTICE ON THIS WORK PROGRAMME

This Work Programme covers 2018, 2019 and 2020. The parts of the Work Programme that relate to 2020 (topics, dates, budget) have, with this revised version, been updated. The changes relating to this revised part are explained on the Funding & Tenders Portal.

DISCLAIMER

This draft has not been adopted or endorsed by the European Commission. Any views expressed are the preliminary views of the Commission services and may not in any circumstances be regarded as stating an official position of the Commission. The information transmitted is intended only for the Member State or entity to which it is addressed for discussions and may contain confidential and/or privileged material.

Horizon 2020 – Cross cutting activities

Call - Building a Low-Carbon, Climate Resilient Future: Next-Generation Batteries

(European Commission Decision C(2019)XXXX of XX June 2019)

LC-BAT-1-2019: Strongly improved, highly performant and safe all solid state batteries for electric

LC-BAT-2-2019: Strengthening EU materials technologies for non-automotive battery storage (RIA)

LC-BAT-3-2019: Modelling and simulation for Redox Flow Battery development

LC-BAT-4-2019: Advanced Redox Flow Batteries for stationary energy storage

LC-BAT-5-2019: Research and innovation for advanced Li-ion cells (generation 3b)

LC-BAT-6-2019: Li-ion Cell Materials & Transport Modelling

LC-BAT-7-2019: Network of Li-ion cell pilot lines

2019: 114M€

LC-BAT-8-2020: Next-generation batteries for stationary energy storage

LC-BAT-9-2020: Hybridisation of battery systems for stationary energy storage

LC-BAT-10-2020: Next generation and realisation of battery packs for BEV and PHEV

LC-BAT-11-2020: Reducing the cost of large batteries for waterborne transport

A large-scale research initiative on Future Battery Technologies

LC-BAT-12-2020: Novel methodologies for autonomous discovery of advanced battery chemistries

LC-BAT-13-2020: Sensing functionalities for smart battery cell chemistries

LC-BAT-14-2020: Self-healing functionalities for long lasting battery cell chemistries

LC-BAT-15-2020: Coordinate and support the large scale research initiative on Future Battery Technologies

New topics for 2020: 132M€

Total: 246M€ for battery research in Work Programme 2019-2020

Work Programme 2020 (draft)

Horizon 2020 – Cross cutting activities

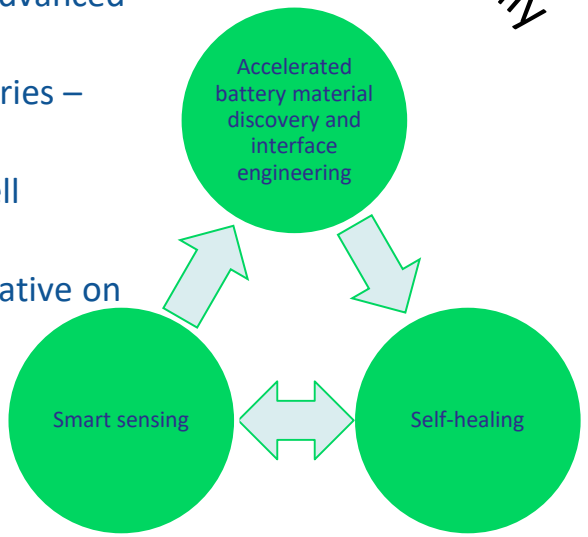
- **Kick start a large scale research initiative on future battery technologies**
  - LC-BAT-12-2020 Novel methodologies for autonomous discovery of advanced battery chemistries – 20M€, R&I, one single project
  - LC-BAT-13-2020 Sensing functionalities for smart battery cell chemistries – 10M€ , R&I
  - LC-BAT-14-2020 Self-healing functionalities for long lasting battery cell chemistries – 10M€ , R&I
  - LC-BAT-15-2020 Coordinate and support the large scale research initiative on future battery technologies – 2 M€, CSA

42M€, closing 16th of January 2020

- **Kick start Member States joint support (ERANET)**
  - CE-NMBP-41-2020: Call for continuation of M-ERA.NET – 15M€
  - A joint call in 2020 with 5M€ of the EU top-up earmarked for battery activities

5M€ earmarked for battery, closing 13th of February 2020

Opening 9th of July



Work Programme 2019-2020 (draft)

European Commission

European eic INNOVATION Council BETA

EMPOWERING EUROPEAN INNOVATORS

EIC PATHFINDER
FET-Open
&
FET-Proactive
WP2019-2020

https://ec.europa.eu/programmes/horizon2020/en/h2020-section/european-innovation-council-eic-pilot

Research and Innovation

Work Programme 2019*

FETProact-EIC-05-2019 budget: 52M€* Deadline: 3 Sep2019*

Emerging paradigms and communities

- To explore and consolidate a new technological direction in order to put it firmly on the map as a viable **paradigm for future technology**.
- Stimulate the emergence of a European innovation eco-system around a **new technological paradigm**
- **Scope is one of the following subtopics:**
  a. Human-Centric AI
  b. Implantable autonomous devices and materials
  c. Breakthrough zero-emissions energy generation for full decarbonisation*
- Up to **€4-5 million and u**p to **4 years**

* Update pre-published as draft (adoption foreseen end of June) :
- Call deadline shifted to 8 of October 2019
- Budget raised to 87,4M€ with a minimum of 35,4M€ on subtopic c
- Sentence excluding 'Battery-based solutions and fuel/solar cells' removed in c

https://ec.europa.eu/programmes/horizon2020/sites/horizon2020/files/eic-pilot_h2020_wp-2018-2020-draft_.pdf

Merci de votre attention!