extended

Next generation of multifunctional, modular and scalable solid state batteries system

NEWSLETTER

ISSUES NO.6 | 2026





ABOUT THE PROJECT

EXTENDED, a Horizon Europe project, is a collaborative effort bringing together 17 partners and one affiliated entity from 10 countries. Our mission is to design, develop, and validate the next-generation battery pack systems that will drive the mass-market adoption of electric vehicles and applications.



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A FAREWELL MESSAGE

FROM THE EXTENDED PROJECT COORDINATOR

SIXTH EDITION

Dear EXTENDED Community,

As the EXTENDED project comes to an end, we take this opportunity to reflect on a remarkable journey of collaboration. Bringing together 17 partners and one affiliated entity from 10 countries, EXTENDED has been driven by a common ambition: to contribute to the development of safer, more sustainable, and higher-performance battery systems that can support the widespread adoption of electric mobility and other energy applications.

Throughout this journey, our consortium has combined diverse expertise, knowledge, and perspectives to address some of the key technological challenges associated with next-generation semi-solid-state batteries.

Beyond the scientific and technological work, one of the project's greatest strengths has been the collaboration established among its partners. The exchange of knowledge, the challenges overcome together, and the relationships built throughout the project represent a valuable legacy that extends beyond its formal conclusion.

On behalf of the coordination team, I would like to express my sincere gratitude to all consortium partners for their dedication, professionalism, and commitment. I would also like to thank the European Commission, our stakeholders, and everyone who has followed and supported EXTENDED along the way.

While the EXTENDED project is reaching its conclusion, its ambition does not end here. The knowledge generated, the technological advances pursued, and the partnerships established provide a foundation for future research, innovation, and collaboration towards a safer and more sustainable European battery ecosystem.

Thank you for being part of the EXTENDED journey. Together, we have contributed to shaping the future of energy storage.



Bruno Rodrigues, AVESTA
EXTENDED Project Coordinator

MILESTONES MOMENTS

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EXTENDED CONSORTIUM GATHERS IN BRUSSELS FOR ITS FINAL GENERAL ASSEMBLY MEETING

OCTOBER 2026









On 14 October 2026, the EXTENDED consortium gathered in Brussels for its Final GA Meeting, marking an important milestone in the project's journey towards the development of next-generation semi-solid-state battery systems. Held just one day before the EXTENDED Final Event, the meeting brought project partners together to review the progress achieved, discuss key technical developments, and coordinate the final steps towards the project's conclusion.

Throughout the meeting, partners presented and discussed the latest developments across several key work packages, covering electrical solutions, battery testing and validation, sustainability, dissemination, exploitation, and project management. The agenda also included discussions on the project's final reporting activities and overall wrap-up, allowing consortium members to align on the remaining priorities.

Taking place on the eve of the EXTENDED Final Event, this last GA set the stage for sharing the project's achievements with a wider audience, reinforcing the importance of continued research, knowledge exchange, and collaboration in shaping the future of energy storage and electric mobility.

As EXTENDED approached its conclusion, the consortium looked back on a journey of innovation and partnership, leaving a valuable foundation for future developments in next-generation battery systems.





MILESTONES MOMENTS

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EXTENDED FINAL EVENT IN BRUSSELS

OCTOBER 2026

On 15 October 2026, the EXTENDED project celebrated its **Final Event in Brussels, Belgium**. Held at the Thon Hotel Brussels City Centre, the event marked an important milestone in the EXTENDED journey, highlighting the collaborative efforts of 17 partners and one affiliated entity from 10 countries towards the development of safer, more efficient, and more sustainable battery technologies.

One of the main highlights was the EXTENDED Workshop: **"From Challenge to Breakthroughs"**, during which consortium partners presented an overview of the project's technical results and demonstrators. The session showcased developments in battery system design, thermal management, battery management systems, safety, testing and validation, and sustainability, while also exploring the potential impact, exploitation opportunities, and future applications of the technologies developed.

The programme continued with the **EU-INGENIOuS Cluster** session, **"Towards the Batteries of Tomorrow"**, featuring contributions from the **BATSS EU and TEMPEST projects**. This session highlighted complementary European research initiatives and the importance of collaboration in advancing innovative battery technologies.

Another key moment was the **panel discussion on "Battery Innovation, Sustainability and Industrialisation"**, which focused on research results, lessons learned, future challenges, and opportunities for continued collaboration.

The event concluded with closing remarks followed by a networking session. Participants also had the opportunity to explore the project demonstrators during a dedicated viewing session.

WATCH THE FULL SESSION ON YOUTUBE









MILESTONES MOMENTS

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EXTENDED FEATURED BY BATTERY CLUSTER PORTUGAL

OCTOBER 2026

The EXTENDED project was recently highlighted by **Battery Cluster Portugal**, recognising its contributions to the development of safer, more efficient, and sustainable next-generation semi-solid-state battery technologies.

The publication showcased some of the project's key achievements. It also mentions the contributions of Portuguese consortium partners INEGI and INOVA+, highlighting their involvement in sustainability, thermal management, communication, and project coordination activities.

This dissemination initiative contributes to increasing the visibility of EXTENDED's results and reinforcing its potential impact on the European battery value chain.


Battery Cluster Portugal

Newsletter Mensal | Outubro 2026
Members Only

No Battery Cluster acompanhamos de perto a evolução do setor das baterias e das tecnologias associadas. Nesta newsletter partilhamos consigo notícias, projetos, eventos e iniciativas que marcam o nosso trabalho e o da comunidade.
Este é, também, um espaço de partilha dos nossos associados: convidamo-lo(a) a enviar-nos informações sobre projetos, eventos ou outras iniciativas em que esteja envolvido e que gostaria de ver divulgadas junto da comunidade do Cluster.

Juntos, damos voz ao d

A equipa do Battery Clu

OS NOSSOS MEMBROS

NOTÍCIAS

Projeto EXTENDED aproxima-se da conclusão e apresenta resultados no desenvolvimento de baterias de nova geração

O projeto europeu EXTENDED, financiado pelo programa Horizonte Europa, aproxima-se da conclusão dos seus três anos de investigação e inovação, apresentando resultados no desenvolvimento de baterias de estado semissólido mais sustentáveis, seguras e eficientes, com uma arquitetura modular e escalável, adaptável e diferentes aplicações, desde veículos elétricos a sistemas estacionários de armazenamento de energia.

O consórcio internacional, que integra os associados INEGI e INOVA+, alcançou resultados relevantes, incluindo o desenvolvimento de um módulo de bateria de 3,11 kWh, a integração de sistemas avançados de monitorização e gestão térmica e a redução de até 20% no tempo de montagem. O INEGI destacou-se nas áreas da sustentabilidade e gestão térmica, enquanto a INOVA+ contribui para a coordenação e comunicação do projeto.

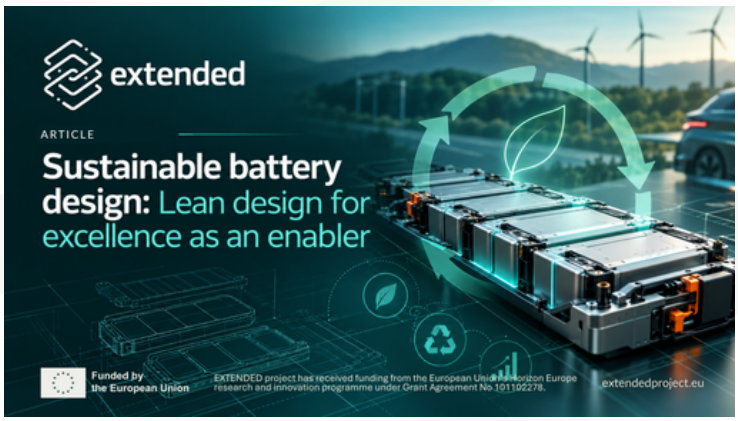
Os resultados obtidos reforçam o potencial destas tecnologias para o desenvolvimento de soluções de armazenamento de energia mais seguras, eficientes e sustentáveis, contribuindo para a evolução da cadeia de valor europeia das baterias. **Saiba mais sobre o projeto EXTENDED aqui.**

EXTENDED ARTICLE BY DESIGNING MORE SUSTAINABLE BATTERIES

OCTOBER 2026

A non-scientific article was published on LinkedIn based on the paper developed by INEGI about "**Sustainable battery design: Lean design for excellence as an enabler**".

The research applies the **Lean Design-for-eXcellence (Lean DfX) methodology** to identify opportunities for improving battery packs throughout their lifecycle, from manufacturing to second-life applications and recycling.



SCIENTIFIC PUBLICATION HERE

READ THE FULL ARTICLE

KEY RESULTS IN SAFETY ASSESSMENT & VALIDATION

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Throughout the EXTENDED project, an extensive validation campaign was performed to assess the performance, thermal behaviour and monitoring capabilities of the developed semi-solid-state battery modules under representative operating conditions. Testing included EV driving cycles, e-bus load profiles, 1C charge/discharge tests and stationary energy storage scenarios. The results demonstrate significant progress towards safe, efficient and scalable next-generation battery systems.

1. ADVANCED THERMAL MANAGEMENT SUCCESSFULLY VALIDATED

The EXTENDED battery modules incorporate an innovative cooling concept combining a graphite heat-spreading layer with a liquid-cooled cold-plate architecture. Validation testing demonstrated that this thermal management approach effectively controlled cell temperatures during demanding operating conditions.

Across all major test scenarios, cell temperatures remained within the desired operating range while temperature differences between cells remained limited. This contributes to more uniform ageing behavior and supports long-term battery performance and reliability.

Key achievements:

- Effective temperature control demonstrated during realistic application profiles.
- Low temperature gradients observed across the battery modules.
- Successful validation of the EXTENDED cooling architecture.



DAQ temperature measurement

KEY RESULTS IN SAFETY ASSESSMENT & VALIDATION

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2. BATTERY MODULES DEMONSTRATED SUITABILITY FOR REALISTIC MOBILITY APPLICATIONS

The developed battery modules were validated using representative electric vehicle and electric bus duty cycles under various environmental conditions. The modules successfully operated throughout the complete test campaign.

The results confirm the applicability of the EXTENDED battery concepts for future mobility applications while demonstrating robust performance across a broad operating range.



Bozankaya e-bus

Key achievements:

- Successful validation using realistic EV and e-bus operating profiles.
- Stable operation across multiple environmental conditions.
- Demonstrated readiness for future transport applications.

3. INNOVATIVE MONITORING TECHNOLOGIES DEMONSTRATED AT MODULE LEVEL

A key innovation within EXTENDED is the integration of advanced sensing and monitoring concepts within the battery modules. Different module implementations successfully monitored critical battery parameters such as cell voltage and temperature using different sensing principles, communication architectures and battery management approaches.

The collected data enabled detailed insight into battery behavior throughout the validation campaign and confirmed the feasibility of advanced monitoring systems for future battery applications.



CEA Battery Module

Key achievements:

- Continuous monitoring of critical battery parameters.
- Validation of innovative sensing and communication concepts.
- Improved visibility of battery behavior during operation.

PUBLICATIONS & RESEARCH UPDATES

SIXTH EDITION

As the EXTENDED project comes to a close, we are pleased to share the scientific publications produced throughout its journey. These publications reflect the valuable research, expertise, and collaborative efforts of our consortium partners, covering key areas such as next-generation semi-solid-state batteries, battery performance, thermal management, safety, sustainability, and advanced battery management systems. Together, they represent an important part of EXTENDED's scientific legacy and its contribution to advancing battery technologies in Europe. In this final edition of our newsletter, we invite you to explore these publications and discover the knowledge and insights generated throughout the project, which we hope will continue to inspire future research, innovation, and technological developments.

MARCH 2024

COMPARATIVE ANALYSIS OF COMMONLY USED MACHINE LEARNING APPROACHES FOR LI-ION BATTERY PERFORMANCE PREDICTION AND MANAGEMENT IN ELECTRIC VEHICLES

Authors: Oyucu, S., Doğan, F., Aksöz, A., & Biçer, E.
Published in: Applied Sciences, 14(6), 2306 (2024)
Type: Scientific Journal Article
Read the publication: **https://doi.org/10.3390/app14062306**



APRIL 2024

DISCHARGE CAPACITY ESTIMATION FOR LI-ION BATTERIES: A COMPARATIVE STUDY

Authors: Oyucu, S., Dümen, S., Duru, İ., Aksöz, A., & Biçer, E.
Published in: Symmetry, 16(4), 436 (2024)
Type: Scientific Journal Article
Read the publication: **https://doi.org/10.3390/sym16040436**

APRIL 2025

SUSTAINABLE BATTERY DESIGN: LEAN DESIGN FOR EXCELLENCE AS AN ENABLER

Authors: Gonçalves, R., Soares, M. I., Morshed Varzandeh, M. H., Chen, Q., & Lourenço, E.
Published in: Procedia CIRP, 135, 685–690 (2025)
Type: Scientific Article
Read the publication:
https://doi.org/10.1016/j.procir.2025.01.068

PUBLICATIONS & RESEARCH UPDATES

SIXTH EDITION

MAY 2025

A COMPREHENSIVE METHODOLOGY FOR CHARACTERIZATION AND ELECTRO-THERMAL MODELLING FOR A NEXT-GENERATION SOLID-STATE BATTERY

Authors: García, A., Micó, C., Chávez Cobo, M., Elkourchi, I., & Vemula, J. B.
Published in: Energy, 322, 135601 (2025)
Type: Scientific Journal Article
Read the publication:
https://doi.org/10.1016/j.energy.2025.135601

MAY 2025

SOLID-STATE BATTERIES: CHEMISTRY, BATTERY, AND THERMAL MANAGEMENT SYSTEM, BATTERY ASSEMBLY, AND APPLICATIONS—A CRITICAL REVIEW

Authors: Biçer, E., Aksöz, A., Bakar, R., Odabaşı, Ç., Vonk, W., Soares, M. I., et al.
Published in: Batteries, 11(6), 212 (2025)
Type: Scientific Review Article
Read the publication:
https://doi.org/10.3390/batteries11060212

SEPTEMBER 2025

ELECTRIC VEHICLE AND ENERGY STORAGE SYSTEMS

Authors: Biçer, E., Aksöz, A., Odabaşı Özer, Ç., Uzel, A., Gençtürk, M., Ceylan Cengiz, E., & Çelik, B.
Published in: Development of Electric Vehicles in Smart Grid Concepts, Elsevier (2025)
Type: Book Chapter
Read the publication: **https://doi.org/10.1016/B978-0-443-30140-7.00006-5**



PUBLICATIONS & RESEARCH UPDATES

SIXTH EDITION

JUNE 2026

THERMAL RUNAWAY IN LARGE FORMAT SEMI-SOLID-STATE CELLS: ANALYSIS OF ABUSE TEST RESULTS AND MACHINE-LEARNING-BASED CORE TEMPERATURE PREDICTION

Authors: Jimoh, B. A., Schieber, C., Odabasi, C., Kotak, Y., & Schweiger, H.-G.
Published in: Journal of Energy Storage, 163, 121850 (2026)
Type: Scientific Journal Article
Read the publication:
https://doi.org/10.1016/j.est.2026.121850

JULY 2026

EXPERIMENTAL INVESTIGATION OF THERMAL MANAGEMENT IN SEMI-SOLID-STATE BATTERY MODULES UNDER CONSTANT CURRENT AND DRIVING CYCLES

Authors: García, A., Micó, C., Marco-Gimeno, J., & Elkourchi, I.
Published in: Applied Thermal Engineering, 300, 131424 (2026)
Type: Scientific Journal Article
Read the publication:
https://doi.org/10.1016/j.applthermaleng.2026.131424

OCTOBER 2026

DEMYSTIFYING SEMI-SOLID-STATE BATTERIES: INSIGHTS FROM X-RAY PHOTOEMISSION SPECTROSCOPY AND ELECTRICAL ABUSE TESTS

Authors: Jimoh, B. A., Fan, Y., Schieber, C., Lindemann, O., Maximillian, M., Sevinç, S., Kotak, Y., Hofmann, J. P., & Schweiger, H.-G.
Published in: Batteries, 12(10), 411 (2026)
Type: Scientific Journal Article
Read the publication:
https://doi.org/10.3390/batteries12100411



The **EXTENDED** newsletter is released semi-annually with the primary goal of fostering awareness about our project and its results, shedding light on the transformative impact of battery development on eco-friendly transportation.

DIVE INTO OUR WORLD!

Stay informed about our project and the dynamic field of battery development.

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SUBSCRIBE

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