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STELLAR
PROJECT

STELLAR Project marks its first year advancing next-gen lithium metal anode manufacturing in Europe

One year after its kick-off, STELLAR has progressed from project launch to concrete technical specifications, engineering actions and early validation activities for safe, sustainable and high-throughput production of reliable lithium metal anodes.

About

The STELLAR Project has reached its one-year milestone, marking an important step in its mission to support Europe's energy independence through next-generation battery manufacturing. Launched in June 2025, the Horizon Europe project is developing safe, sustainable and high-throughput production routes for reliable lithium metal anodes for Gen 4b/4c solid-state batteries and Gen 5 lithium-sulfur batteries.

During its first year, the STELLAR consortium has moved from initial project setup to detailed technical development. Partners have defined key requirements and specifications for lithium metal anode production, protective coating processes, inspection systems, battery cell validation and module-level performance. This work lays the foundation for the project's roll-to-roll manufacturing approach, which aims to enable industrially relevant, scalable and cost-competitive lithium metal anode production.

A key focus of the first year has been the development pathway for the Pre-STELLAR machine at AVESTA's facility in Ninove, Belgium. The system is designed to process 300 mm copper foil and deposit lithium metal layers of up to 20 μm using thermal evaporation, with protective artificial solid electrolyte interphase coatings applied through magnetron sputtering. The project has also advanced plans for pre-treatment, in-line inspection, sensing systems and improved handling for double-sided coating.



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At the one-year mark, STELLAR has achieved several important steps:

- Completed core requirements and specifications for lithium metal anode production, protective layer manufacturing and inspection systems.
- Defined battery cell requirements, testing protocols and validation pathways for Gen 4b/4c/5 technologies.
- Locked key technology options for lithium metal deposition and post-coating processes.
- Progressed engineering activities for the roll-to-roll Li-metal coater and its future upgrades.
- Advanced in-line quality control concepts for lithium and protective coating thickness, uniformity and surface monitoring.
- Began protective coating screening and early electrochemical testing of lithium metal anodes in lab-scale cells.
- Initiated data-driven process optimisation and digital twin architecture for lithium metal anode manufacturing.
- Developed initial recycling routes, sustainability assessment scenarios and life cycle inventory work.
- Started market, techno-economic, IPR and exploitation activities to support future industrial uptake.
- Strengthened communication and clustering activities through the project website, LinkedIn, newsletter preparation, and engagement with European battery initiatives including Battery 2030+ and the Solid4B Cluster.

The consortium also held its second consortium meeting online in April 2026, bringing partners together to review progress across technical, sustainability, digitalisation, market, and dissemination activities. The meeting confirmed that STELLAR is building strong momentum as it enters its next phase, with upcoming work focused on machine installation, process optimisation, protective coating validation, recycling development, digital integration, and stakeholder engagement.

STELLAR combines advanced manufacturing, in-line quality control, digital tools, sustainability analysis, and industrial exploitation planning to strengthen Europe's battery value chain and accelerate the transition towards high-performance, sustainable, and reliable next-generation energy storage technologies.

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