Policy summary #5

Batteries from waste materials? Opportunities and challenges in the EU

Takeaways and recomendations for policy makers from the Resilex workshops series

On the 19th of May 2026, the Resilex project organized a panel discussion in Brussels to discuss a series of topics relevant to the future of Europe. Key stakeholders were invited to engage in an active discussion on the sustainable exploitation and supply of Critical Raw Materials (CRMs) for the PV and battery industries and the takeaways from the Resilex project's results. This document summarizes the third discussion, focused on Batteries. Check **here** for the other summaries

Waste recylcing for batteries

This third session opened with a presentation by Hamid Oubaha, R&D project manager at the University of Liège (GREEnMat Laboratory), where he highlighted key technical breakthroughs in substituting critical raw materials with recycled alternatives, focusing on the development of advanced Si-based anode active materials for LIBs application.

The core achievement presented by Hamid was the successful pilot scale production and validation of a silicon-carbon (Si/C) composite manufactured using secondary silicon recovered from end-of-life (EoL) photovoltaic (PV) panels (processed by Groupe Comet) and its subsequent integration and validation in multilayer Li-ion pouch (MLP) cells at CEA and CSEM (Resilex battery).

The Resilex Project successfully combined these advances to propose a viable solution for converting low-value Silicon waste from EoL PV panels into high-value Si-based anode active materials. Validation in MLP cells at two research centers (CEA and CSEM) demonstrates the technical feasibility of this approach, offering a promising route toward more circular, resource-efficient LIBs. It further highlights the potential for reliable energy storage systems to be built using secondary raw materials sourced entirely within the European clean-tech ecosystem.
Hamid concluded that this work effectively bridges the solar and battery sectors, proving that cross-industry circularity is both technologically and practically viable at the pilot-scale, and establishing a clear blueprint toward strengthened European material sovereignty.

After the presentation, Hamid was joined in the panel discussion by Kaisa Toroskainen (Global Battery Alliance) and Rafael Castillo (Andalusia Innovation Cluster). The main outcomes are summarized below:

The speakers of the third panel, moderated by Giulio Poggiaroni (ETA Florence Renewable Energies)

Identified Challenges & Bottlenecks

- **Scaling Up Pilot Technologies:** Moving from laboratory and pilot scales (grams/kilograms) to commercial industrial production (tonnes) requires substantial capital expenditure (CapEx), which private markets are often hesitant to finance without reduced technical and commercial risk; thus, de-risking measures must be considered, there's no way around.

- **Evolving Battery Chemistries**: The rapid pace of innovation battery chemistries requires highly flexible recycling infrastructure; otherwise, facilities risk rapid obsolescence if industry standards shift to entirely new chemical systems.

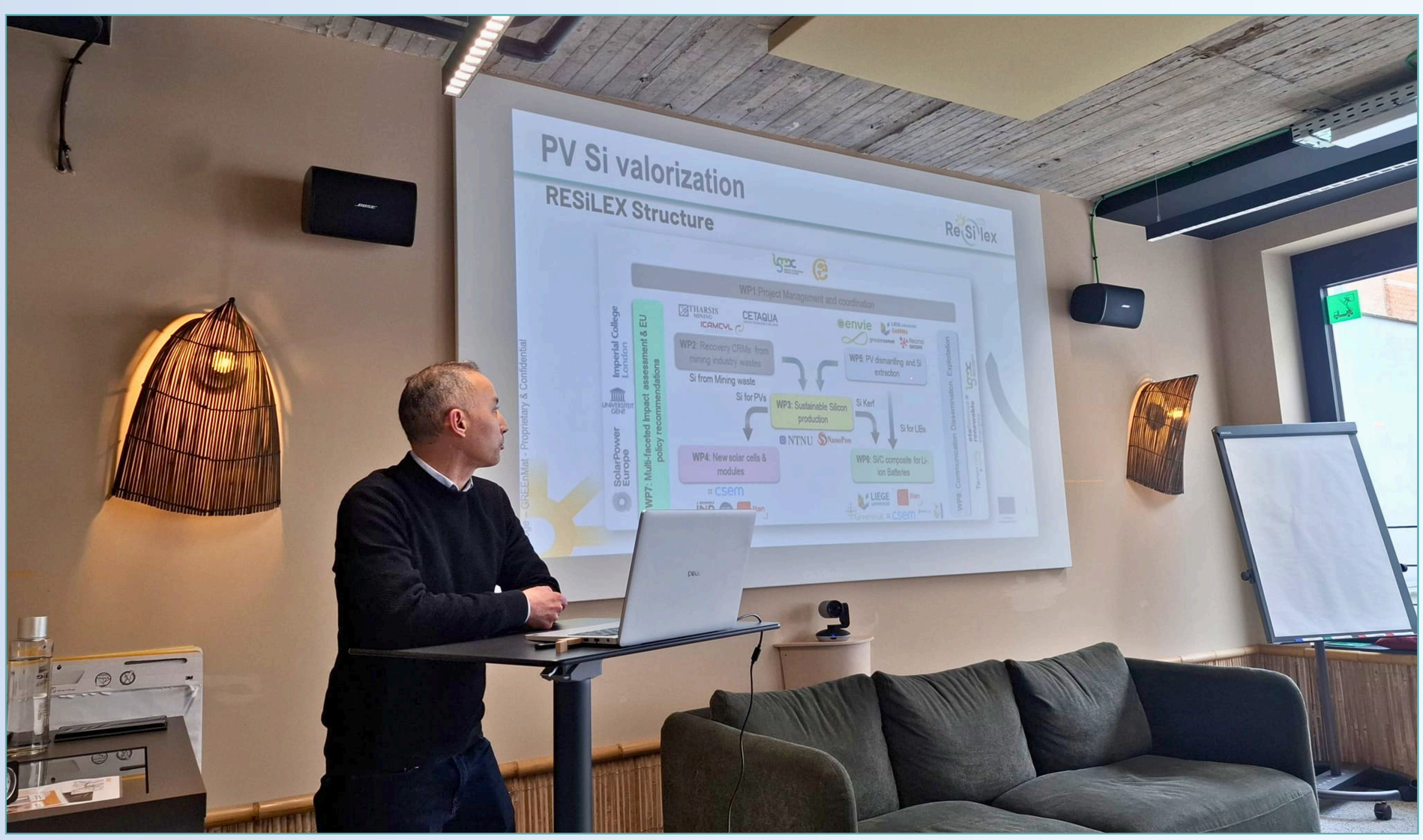
- **Global perspective**: Kaisa Toroskainen (Global Battery Alliance) emphasized that while the European Union has pioneering frameworks (like the EU Batteries Regulation), the battery value chain is fundamentally global. She noted that the industry is rapidly transitioning from a phase of voluntary ESG commitments to legally binding international market expectations. Because mining, refining, assembly, and recycling happen across different continents, localized rules face severe compliance and fragmentation risks without international alignment.

Recommendations Advanced by Speakers

- **Targeted CapEx Funding for Scaling**: European funding bodies should bridge the "valley of death" between pilot validation and industrial-scale deployment through dedicated financing mechanisms, combining grants with commercial loans and blended finance structures.

- **Standardized Regulatory Landscapes**: Ensure that standards and data formats are integrated early into industrial projects, providing manufacturers with clear and predictable regulatory requirements.

- **Battery passport:** Kaisa Toroskainen presented the Global Battery Alliance's Battery Passport initiative, the world's first multi-stakeholder sustainability certification for batteries. This digital tool will enhance supply chain transparency tool, allowing every player to track and verify the origin, composition and environmental footprint of critical battery materials across the entire value chain, from raw material recycling, and efficiently meet national and international regulatory requirements and market and stakeholder expectations.



Hamid Oubaha presenting the results of the Resilex project

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