Standards in Action
HSbooster.eu Success Stories

Success Story #3

Keywords:
#standardisation, #urbanmobility, #electromobility, #environmentalfootprint, #energystorage, #IoT, #battery

High-performance modular battery packs for sustainable urban electromobility

Background

With the growing concern over climate change and air pollution, cities around the world are increasingly adopting sustainable mobility solutions to reduce their carbon footprint. Electromobility, particularly electric vehicles, has emerged as a promising alternative to traditional internal combustion engine vehicles. Sustainable urban electromobility aims to replace conventional fossil fuel-powered vehicles with electric vehicles to promote cleaner and greener transportation in cities. The roadmaps and targets for the optimisation of Li-ion technologies and for the development of new chemistries, such as Li-S, Li-air, or solid-state batteries, are then defined in the Integrated SET-Plan (Action 7) High-performance battery technology is critical for urban electromobility, where EVs are required to have sufficient power, range, and fast charging capabilities to meet the demands of daily urban commuting.

The Challenges

Universally accepted standards for battery pack modules and interfaces can increase the interoperability and unlock the flexibility of integrating batteries into different electric vehicle platforms. Standardisation is crucial to ensure seamless compatibility and facilitate easy replacement or upgrading of battery modules. These standards should address factors such as thermal management, fast charging, and overall system reliability. Adherence to regulatory requirements is also critical for the market acceptance. Harmonising the standards with existing regulations and guidelines helps ensure that these batteries meet safety, environmental, and quality criteria. Standardised communication protocols between battery packs and electric vehicles are vital as well for seamless integration and efficient operation. Common communication protocols enable effective battery management and enhance overall vehicle performance. Additionally, designing battery packs with modular and scalable features requires standardisation in size, form factor, and connectivity. Standardised interfaces and components allow easy upgrading and replacement, promoting circular economy principles.

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The project

HELIOS aims at developing and integrating innovative materials, designs, technologies and processes to create a new concept of smart, modular and scalable battery pack for a wide range of electric vehicles used in urban electromobility services, from mid-size full-electric vehicles to electric buses, with improved performance, energy density, safety and Levelized Cost of Storage (LCoS). This project aims at i) developing new technologies in the field of advanced materials, Li-ion batteries, thermal management, power electronics, sensors and ICTs, which combined allow to create a new concept of standardised, modular and scalable hybrid Liion battery pack for urban electromobility applications; ranging from mid-size vehicles to electric buses, with improved performance, autonomy, safety and LCoS, and minimum carbon footprint; ii) creating new eco-designs and processes, which facilitate its reuse in second life applications and further recycling at its EoL, contributing to a circular and integrated supply chain in the EU for the fabrication of battery packs, as well as effective and sustainable models for urban electromobility; ii) demonstrating the effectiveness of the solution in relevant use cases for urban electromobility, such as EV cars e-Bus fleets.

HELIOS

The Project Standardisation Needs

The EU Electric Vehicle (EV) industry faces aggressive global competition, and each car manufacturer invests significantly in developing their own solutions, leading to a lack of standardisation in the industry. HELIOS focuses on defining scenarios, procedures, and certification standards for validating its solution in car-sharing and e-bus applications. The project addresses standardisation of battery management system (BMS) technologies to maximise compatibility, safety, and quality for large EV battery packs. HELIOS deals with the lack of standards and data-sharing for the residual value of battery capacity, proposing standardised methodologies and protocols to extract useful data from EV battery cells. Overall, the project aims to foster standardisation in the automotive industry, enabling efficient and sustainable electromobility services while promoting compatibility and safety across various applications.

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The HSbooster.eu Expert

Leila C.W. Muchanga-Hvelplund is a chartered engineer, a chartered quality professional and a Lean practitioner with 15 years of combined experience in transportation, including digital technology and passenger experience (e.g., road and rail). Leila currently works as an Independent Expert at CINEA (The European Climate, Infrastructure, and Environment Executive Agency) and is the Founder & CEO of ASI.Gov ApS in Denmark. As a Transportation Research Assistant at the University of Birmingham, Leila conducted a systematic literature review to support the development of a traffic fatality reduction strategy in India. During the tenure at Accenture, Leila served as an offshore Project Manager, successfully managing the design, procurement, and implementation of an IT platform cloud solution for the EMEA, Americas, and Asia. At Costain in the UK, Leila held the position of Research and Development Manager, introducing a new in-house tool for bridge movement. As a quality professional, both at project and programme level, she performed with quality management practices (e.g., ISO standards, knowledge share, training materials, lectures) as Leila also worked as a Technical Architect at Ericsson in the Netherlands and a Digital Television Interactive Engineer at UPC in Ireland.

THE HSBOOSTER.EU EXPERT

Leila C.W. Muchanga-Hvelplund

Founder and CEO of ASI.Gov ApS

Success and structure: These things provide.

The HSbooster.eu Consultancy service

To support the project's standardisation activities, the consultancy service provided several recommendations:

- Standardisation readiness: HELIOS and the expert assessed the preparedness for standardisation and aligned HELIOS' objectives with relevant standards.
- Standards and standardisation mapping landscape: The expert helped identify relevant standards and technical committees related to HELIOS' work, ensuring adherence to established norms.
- Standardisation strategy and engagement: Engaging with key stakeholders in standardisation bodies, like ISO, IEC, IEEE, CEN, and CENELEC, can help the project influence and contribute to relevant standards.
- Standards deliverables: The experts recommended that HELIOS consider submitting proposals for new work items in existing technical committees to contribute to the standardisation process.
- Training material: The expert suggested that HELIOS partners participate in HSbooster.eu webinars and national-level education programmes to enhance the project's understanding of standardisation.
- The consultancy service also pointed out specific resources, such as ISO standards, technical manuals, and EU legislation, related to wireless communication protocols, data privacy (GDPR). The service highlighted the importance of data-driven BMS, providing information on collecting specific data formats.
- Furthermore, the consultancy service suggested looking into ISO 27701 for managing privacy information and recommended participating in existing standardisation projects related to Battery and BMS to accelerate the standard development process within the project's tight timeframe.

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Benefits & Impact

Leila's support through HSbooster.eu has brought several benefits to HELIOS. Thanks to her expertise, the project now possesses a deeper understanding of standardisation practices and opportunities within the electromobility and transport domain. By aligning with ongoing standardisation activities and actively engaging with relevant committees, HELIOS has the unique opportunity to establish itself as a key contributor to the advancement of urban mobility solutions.
The successful integration of standards and standardisation practices not only bolsters the project's credibility and relevance but also positions the innovative methodologies developed by HELIOS as potential benchmarks for future standards. This recognition and alignment with industry standards not only enhance the impact of the project but also contribute significantly to the broader adoption of accepted standards within the sector. Leila's support and the collaboration with HSbooster.eu have played a pivotal role in strengthening HELIOS's position as a leader in sustainable urban electrification and fostering a more standardised and interconnected electromobility landscape.

Future Plans

Based on the insights and recommendations provided by Lelia, HELIOS has a clear strategy for the future. HELIOS will actively liaise with Technical Committees (TC), Subcommittees (SC), and Working Groups (WG) that are pertinent to the project's objectives. By establishing connections with these bodies, HELIOS can contribute to the development of standards in the field of electrification and transport. HELIOS will also consider obtaining trial memberships in national mirror committees related to its research domain. This will provide the project with valuable insights into ongoing standardisation activities and opportunities for collaboration. HELIOS will prioritise engagement with standardisation bodies at both the system level and the battery level. This multi-level approach will ensure comprehensive standardisation coverage. Moving forward, HELIOS remains committed to flexibility, openness, and alignment with EU strategies and regulations.