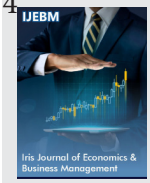

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Battery Regulation and the Reconfiguration of Market Access in Global EV Supply Chains

Yuan Fang*

Pre-doctoral Researcher, University of Salamanca, Spain

Corresponding author: Yuan Fang, Pre-doctoral Researcher, University of Salamanca, Spain

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Introduction

The adoption of Regulation (EU) 2023/1542 on batteries and waste batteries marked an important shift in how the European Union governs the electric vehicle (EV) battery sector. It replaced the previous Directive 2006/66/EC, which was largely focused on waste management and end-of-life issues, and moves toward a harmonized framework with direct legal effect across Member States. In broader terms, the new regulation reflected the EU's is now gradually becoming a more integrated and market-oriented style for environmental regulation. What is particularly notable is how sustainability requirements are now being built directly into market access conditions. Regulation (EU) 2023/1542 brought together obligations on carbon footprint disclosure, recycled content, due diligence, and the battery passport system, extending regulatory reach across the full battery lifecycle. This means that compliance is no longer just something external to market participation. Instead, it is increasingly part of what defines whether firms can operate in the EU market at all [1].

Compliance Requirements and Business Challenges

The EU regulatory shift introduces a set of interconnected compliance obligations that reshape operational requirements for EV battery producers globally. First, carbon footprint reporting has become a major compliance constraint especially when comes to developing countries. It requires all firms to calculate the lifecycle emissions using verifiable and standardised data from across production stages. But in reality, this would be very difficult because electricity mixes vary significantly across countries and many suppliers do not yet provide consistent emissions data. As a result, companies might find themselves struggling to build reliable and comparable carbon accounting systems that can met the data quality requirement [2].

Furthermore, recycled content requirements extend regulatory control from the product itself into material sourcing and recycling systems. Although this was originally designed to support circular economy objectives for a longer lifespan, in reality the implementation itself heavily depends on the ability of companies to accurately track the origins of secondary materials across complex supply chains. Many firms face challenges because supplier-level data on recycled inputs is often incomplete from the outset or inconsistently reported, especially in multi-tier production networks [3].

In addition, this new Regulation also requires companies to comply with its due diligence obligations, which are aligned with the OECD framework, particularly in the identification and management of environmental and human rights risks across mineral sourcing activities. As labour, environmental standards, as well as supply conditions vary significantly across the globe, such regulation can create additional constraints for those who do not follow the European approach, particularly in developing countries that face limited regulatory enforcement capacity, uneven labour protections, and weaker environmental monitoring systems, making full alignment with EU-level expectations almost impossible in practice. With the introduction of the battery passport system in 2027, transparency across the value chain is expected to improve through digital lifecycle data sharing. However, this will also increase exposure to data governance risks such as cyber security

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threats and the handling of commercially sensitive information. Additionally, for some companies and jurisdictions, the growing compliance requirements may effectively limit access to the EU battery market [4].

Market Access and Industrial Implications

Obligations Under new EU Regulation are indeed reshaping global cost structures and competitive dynamics across the EV battery industry. According to EUROBAT, complying with carbon reporting, recycled content verification, and battery passport requirements demands significant investment in monitoring systems and digital infrastructure. Compliance is shifting from discrete legal reporting to continuous data production and verification, embedding regulatory obligations directly into operational processes. This increases fixed compliance costs and operational complexity. As a result, the rising costs of compliance are making it harder for less integrated companies to enter the market, while giving an advantage to vertically coordinated players with strong data and supply chain management capabilities. This trend may encourage companies that can handle regulatory complexity to invest in technological improvements, but also speed up industry consolidation. Compliance is no longer just about meeting the necessary legal requirements, but has become a key factor in competitive positioning within the EV battery value chain. And companies that struggle to implement such traceability and sustainability standards due to any reason might risk facing significant barriers to accessing the EU market [5].

Responses

As regulatory requirements grow more complex and continue to evolve, companies are also gradually moving away from isolated compliance tasks and start to adopting a more integrated and system-wide strategies. Instead of handling each regulation or obligation on its own, they are now focusing on creating unified compliance frameworks that can support carbon accounting, material traceability, due diligence and all to other requirement in conjunction. A major focus is on building strong digital and data management systems throughout the battery value chain. This involves enhancing traceability across multiple supplier levels and improving company's ability to collect and verify life cycle data. Additionally, working closely with upstream suppliers has also becoming important. Companies need to ensure that environmental and sourcing reports are consistent with regulation demands, especially in regions where suppliers are located in areas with uneven regulatory and reporting capacities. Combined with investing more in low-carbon inputs, expanding recycling capabilities, and adopting third-party verification processes, together, these steps will help lower long-term compliance risks and secure their continued access to the EU market [6].

Conclusion

The EU Batteries Regulation reflected a broader reconfiguration of regulatory governance, in which sustainability requirements are directly embedded into market access conditions for the EV battery industry. This indicates a shift from compliance as an external obligation toward regulation as a structural determinant of participation in global EV supply chains. If firms wish to continue accessing the EU market, they will need to develop integrated compliance capabilities that can operationalise sustainability, traceability, and data governance requirements within their core supply chain structures.

Acknowledgements

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Conflict of Interest

None.

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