



## D3.2.2 Mapping report of potential business partners in ESEE partnership countries

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## Abstract

'D3.2.2: Mapping report of potential business partners in ESEE partnership countries' is a deliverable aiming to increase partnership knowledge regarding the actors involved in Lithium-ion Battery (LIB) markets in ReLi-ion target countries. The data used and presented in this report were provided by partners, who conducted mapping research, assisted by the guidelines in D3.2.1. According to the data collected, most actors fall within the LIB collectors and recyclers category, followed by ReLi-ion products end-buyers, R&D actors, regulators and policy makers and business enablers. Most actors were identified in Romania and Hungary, while Greece has the smallest number of relevant stakeholders. Despite the undersized LIB markets in the ReLi-ion participating countries, a number of market and regulatory developments are expected to increase the LIB value chain actors exponentially in the future.



## Introduction

In the pursuit of cleaner and more sustainable energy solutions, LIBs have emerged as a vital technology, powering a wide range of applications, from electric vehicles to portable electronics. As their popularity continues to soar, it becomes increasingly important to address the environmental impact associated with Li-ion batteries, particularly their end-of-life management. The exponential growth in Li-ion battery consumption in Europe has led to a corresponding increase in the volume of battery waste generated. Improper disposal of these batteries can have severe consequences for the environment, including the release of toxic chemicals and heavy metals, as well as the loss of valuable resources. Recognizing this challenge, ReLi-ion will transfer an innovative technological approach for NMC and LFP LIB treatment, across the ESEE region. To effectively realise this objective, partners need to identify actors and stakeholders relevant to the LIB value chain with the potential to become business partners.

D3.2.2 “Mapping report of potential business partners in ESEE partnership countries” aims to provide a comprehensive overview of the key stakeholders involved in territorial (LIB) ecosystems, as identified by ReLi-ion partners. It is a follow-up of D3.1.1, that assisted partners in identifying the stakeholders reported in this deliverable. Countries investigated and reported are Slovenia, Greece, Czech Republic, Poland, Romania and Hungary. Even though Romania and Hungary are not actively represented in the ReLi-ion consortium, they were chosen to allow for a more comprehensive understanding of the LIB value chain in the ESEE region. Actors reported in this deliverable include: a) LIB collectors and recyclers; b) business enablers; c) R&D actors; d) end buyers of the ReLi-ion products and e) policy makers. The following table summarizes task allocation of task 3.2.

Partner	Country
IMN	Poland
ECOSIJ	Slovenia
VSCHT	Czech Republic



Sunlight, Monolithos and SE&C	Greece
EXELIA	Romania
PROMEIA	Hungary

## 1.2 Purpose of D3.2.2

A key objective of the ReLi-ion project is to establish robust networking relationships between the partnership and relevant stakeholders in the business, research, and policy sectors actively involved in the management of LIBs. The overarching aim of the project's networking activities is to foster collaborative efforts among the project partners and relevant stakeholders for the establishment of a LIB ecosystem, which adheres to the technological approach outlined by ReLi-ion. To achieve this, the project involves actors from various stages of the LIB value chain to facilitate the exchange of knowledge and capacities, as well as to create platforms for technology transfer. By understanding the roles and interactions of these stakeholders, ReLi-ion partners will gain insights regarding the current state of the LIB recycling industry and identify potential areas for collaboration and improvement. A stakeholder mapping report is crucial for understanding the stakeholders' perspectives, priorities, and potential impacts on the project's implementation. By assessing their level of influence and power, partners can develop tailored business strategies to expand the ReLi-ion approach.

Firstly, D3.2.2 targets the identification of LIB waste collectors, who play a critical role in the initial stage of the recycling process. These entities encompass various organizations, such as waste management companies, collection centers, and recycling facilities that specialize in the collection, transportation, processing and recycling of discarded LIBs. LIB recyclers are another essential segment of the ecosystem that consists of specialized facilities and companies employing innovative technologies to dismantle, sort, and process LIBs. By recovering valuable materials, such as lithium, cobalt, and nickel, recyclers contribute to the circular economy by reintroducing these resources into the production chain. The next group



of territorial stakeholders analysed in this report are regulatory agencies and decision makers. These actors and public entities shape the legal frameworks and guidelines governing LIB recycling, fostering a sustainable and responsible approach to battery waste management.

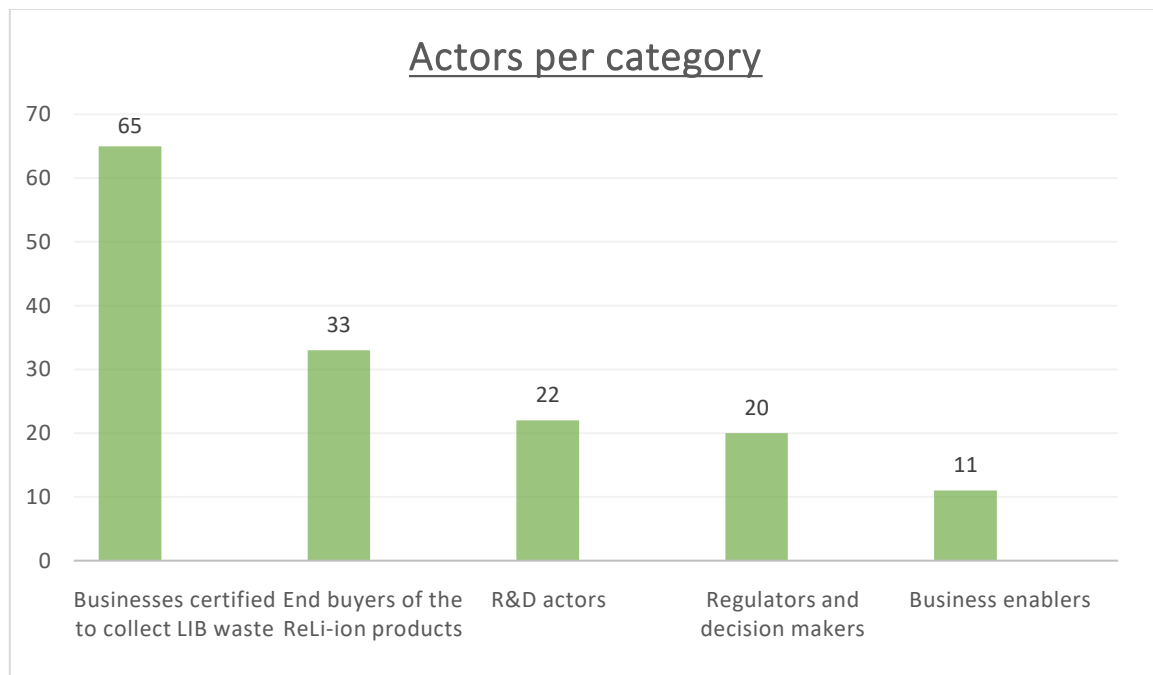
Business enablers, on the other hand, provide the necessary support and infrastructure for the LIB recycling industry. These stakeholders can include investors and financial institutions, whose contributions aid in the development and expansion of recycling facilities, research initiatives, and technological advancements. R&D actors are also pivotal in driving innovation and improving recycling technologies. They comprise research institutions, universities, and technology companies focused on developing new methods for LIB battery dismantling, material recovery, and environmentally friendly processes. Their efforts are instrumental in advancing LIB recycling practices and addressing emerging challenges. Lastly, D3.2.2 explores the territorial landscape pertaining to end-buyers of the ReLi-ion products. This category includes manufacturers of batteries and battery-powered devices across various industries, such as automotive, electronics, and energy storage. By understanding their requirements and preferences, ReLi-ion partners can recognise opportunities to enhance product design for recyclability and facilitate the integration of recycled materials into new LIB production.

The report is structure as follows: section 2 will outline key findings drawn from the data provided by partners. Section 3 will present the data country-by-country while the conclusion will summarise the study.

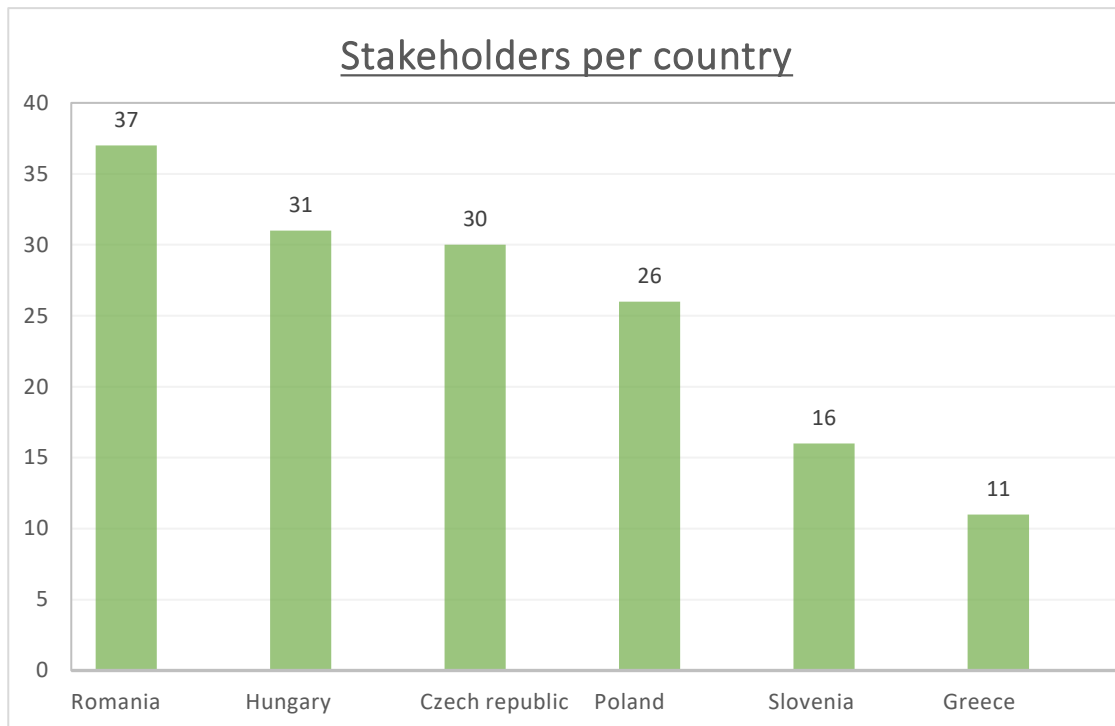


## Data Analysis

This section will provide an overview of the actors identified by partners in the target countries. Furthermore, it will draw linkages between the data and emerging market trends and LIB value chain specificities. The most frequently occurring category of actors in all participating countries is **LIB waste collectors (65)**, which includes LIB collection facilities, logistics actors, recyclers and businesses active in the processing aspect of the value chain. **18** actors from the first category are **LIB recycling facilities**, most of which are **located in Poland (9)**. **Romania and Hungary** have **4 LIB recycling facilities** respectively. The first category is followed by **end buyers of the ReLi-ion products**, where partners identified **33 actors**. **R&D stakeholders (22)**, as well as **regulatory and decision makers (20)** are the next most frequently occurring group, while the last is **business enablers (11)**.



According to the data, most actors are located in Romania, followed by Hungary, Czech Republic, Poland, Slovenia and Greece. The following table provides a comparative perspective of the actors per country. A more detailed presentation of the stakeholders identified per country will follow in the next chapter.



Although the presence of LIB value chain actors in the participating countries is not currently as significant as in other European countries (especially Western), there are several key trends likely to exponentially boost the ESEE LIB market. First of all, the rapid electrification of the mobility sector is pivotal in the increase of demand for LIBs, which will in turn power Europe's electric vehicles. This trend has already risen demand for LIBs in Europe by 30%<sup>1</sup>. Estimations about the medium- and long-term demand for LIBs in Europe, indicate an increase of 88% by 2030<sup>2</sup>. The rapid growth of the EV industry is driving the need for increased LIB manufacturing capacity. Many companies and governments in the ESEE region are investing in the construction of large-scale battery gigafactories to meet the growing demand for LIBs. These facilities aim to achieve economies of scale, reduce costs, and enhance supply chain resilience. Furthermore, as the number of EVs on the road increases, the need for effective

<sup>1</sup> <https://www.econstor.eu/bitstream/10419/217243/1/hbs-fofoe-wp-168-2020.pdf>

<sup>2</sup> <https://ieep.eu/wp-content/uploads/2023/05/Managing-waste-batteries-from-EVs-JP-and-EU-May-2023.pdf>





and efficient battery recycling becomes critical. Developing robust recycling infrastructure is a key trend in the LIB value chain. Governments and industry stakeholders are working on establishing recycling facilities and implementing regulations to ensure the safe and environmentally sound disposal of end-of-life batteries while maximizing the recovery of valuable materials. Romania and Hungary are exemplary cases where government initiatives, combined by the expansion of leading international players in the LIB market (EVE, NIO, JWH) set the ground for the establishment of large-scale manufacturing, processing and recycling plants in Europe.

Secondly, EU regulatory developments, highlighted by the Battery Directive accompanied by the Critical Raw Material, have infused the European LIB market with requirements and values of Raw Material (RM) sustainable sourcing, circularity and second-life approaches. The demand for RMs used in LIBs, such as lithium, cobalt, nickel and manganese, is increasing with the growth of the EV industry. In response, there is a focus on sustainable and responsible sourcing practices to minimize environmental and social impacts. Efforts are being made to establish transparent supply chains and promote ethical mining practices. In addition, EU officials proliferate the need to reduce dependence on imports and ensure a secure supply of batteries for the EV industry, there is a trend toward localizing battery supply chains. This involves establishing a domestic or regional production ecosystem that includes raw material extraction, refining, cell manufacturing, and recycling. Poland<sup>3</sup> and Czech Republic<sup>4</sup>, for instance, are two countries with extended LIB ecosystems and according to these trends are likely to significantly grow the LIB market by 2030. Also, the exploration of second-life applications for used EV batteries, increases the potential for the growth of territorial value chain actors. Second-Life applications describes the processing of spent EV batteries so they can retain a significant portion of their capacity and can be repurposed for energy storage applications. Such practices can offer additional value and extend the lifespan of LIBs.

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<sup>3</sup> <https://evmarketsreports.com/poland-and-hungary-emerging-in-global-battery-supply-chain/>

<sup>4</sup> [https://www.euractiv.com/section/politics/short\\_news/czechia-wants-to-build-a-battery-gigafactory/](https://www.euractiv.com/section/politics/short_news/czechia-wants-to-build-a-battery-gigafactory/)



Lastly, the rapid advancements in LIB technology enables education institutions invest in research and development to improve battery performance, energy density, charging speed, and overall lifespan. Efforts are focused on developing new chemistries, such as solid-state batteries, as well as optimizing existing LIB technologies to meet the specific requirements of the industries incorporating LIBs. Overall, these developments, tightly connected with the advancement of the LIB industry, are expected to increase the number of LIB value chain actors in the ReLi-ion target countries and effectively lead to a long-term monetization of the project's approach. The following section will present the actors identified by partners.



## Actors per country

### 3.1 Poland

Stakeholder Category	Number of Actors
Businesses certified to collect LIB waste (including recyclers)	12 out of which 9 have LIB recycling capacity
Business enablers	4
End buyers of the ReLi-ion products	6
R&D actors	3
Regulators and decision makers	1
<b>Grand Total</b>	<b>26</b>

### 3.2 Greece

Stakeholder Category	Number of Actors
Businesses certified to collect LIB waste	5
Business enablers	1
End buyers of the ReLi-ion products	-
R&D actors	3
Regulators and decision makers	2
<b>Grand Total</b>	<b>11</b>



### 3.3 Czech Republic

Stakeholder Category	Number of Actors
Businesses certified to collect LIB waste	11
Business enablers	1
End buyers of the ReLi-ion products	11
R&D actors	5
Regulators and decision makers	2
<b>Grand Total</b>	<b>30</b>

### 3.4 Slovenia

Stakeholder Category	Number of Actors
Businesses certified to collect LIB waste	11
Business enablers	-
End buyers of the ReLi-ion products	1
R&D actors	2
Regulators and decision makers	2
<b>Grand Total</b>	<b>16</b>



### 3.5 Hungary

Stakeholder Category	Number of Actors
Businesses certified to collect LIB waste (including recyclers)	7 out of which 4 have capacity for LIB recycling
Business enablers	5
End buyers of the ReLi-ion products	9
R&D actors	5
Regulators and decision makers	5
<b>Grand Total</b>	<b>31</b>

### 3.6 Romania

Stakeholder Category	Number of Actors
Businesses certified to collect LIB waste (including recyclers)	18 out of which 4 have LIB recycling capacities
Business enablers	-
End buyers of the ReLi-ion products	6
R&D actors	4
Regulators and decision makers	7
<b>Grand Total</b>	<b>36</b>



## Conclusion

D3.2.2 has presented the organisations, actors and stakeholders as identified by partners in the ReLi-ion participating countries that could become potential business partners. The mapping report has provided a detailed overview of territorial LIB stakeholders, as well as an analysis of key market trends that will likely affect domestic market landscapes in the medium - and long-term. Overall, the countries investigated do not yet have particularly developed LIB value chains, hence domestic markets are not as populated as in Western European countries. However, key trends, such as the EV market rapid growth, political developments pointing towards sustainable RM production and treatment, as well as the business expansion of top LIB players (particularly Asian) in the ReLi-ion countries, is expected to exponentially increase the number of actors by 2030.