This paper was presented at the XXXVII ISPIM Innovation Conference, held in Granada, Spain on 07 June to 10 June 2026. ISBN 978-952-65771-2-8.

Mapping Emerging Lithium-ion Battery Recycling Clusters in South Korea: Spatial Concentration and Value Chain Positioning

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Abstract: Rapid electrification in transportation has led to an increased demand for lithium-ion batteries (LIBs). As batteries in electric vehicles reach their end-of-life, waste and disposal problems are expected in the next years. LIBs contain critical metals such as lithium, nickel, and cobalt. With a growing interest in circular economy and securing material supply chains, there has been extensive research on the technical aspects and economic value of LIBs recycling. However, real-world case combining cluster perspective with technical process aspects received less attention. This study investigates the spatial concentration and value chain positioning of LIBs recycling facilities in South Korea. It demonstrates a mapping of EV infrastructure, industrial recycling facilities, and government-led facilities to identify emerging clusters. The activities and positions of recycling facilities are analysed and characterized based on their functional roles and facility types. In addition, relevant government policies fostering the LIBs recycling sector are investigated.

Keywords: Lithium ion battery; LIBs; battery recycling; circular economy; ecosystem; clusters; innovation; recycling; waste management.

1 Introduction

Lithium ion batteries (LIBs) expanded its application over the years from consumer electronics to electric vehicles (EVs) and energy storage services. Below Figure 1 illustrates the rapid adoption of full battery electric vehicles (BEVs) over time. As electrification of transportation is one of the most promising alternatives to reduce greenhouse gas emissions and to achieve circular economy, governments actively promoted adoption of EVs in 2010s with subsidiaries and building EV infrastructure. Many countries have encouraged the transition from conventional internal combustion engine vehicles to electric vehicles. (Rezaei, et al. 2025; Ghosh 2020, Rietmann et al. 2019)

Below Figure 1 shows that both EV adoption and LIBs recycling research exhibit a similar upward trend. Given that the expected lifetime of electric vehicles batteries ranges from 10 to 15 years, a substantial accumulation of end-of-life lithium-ion batteries (LIBs) is expected within next decades. (Rezaei, et al. 2025; Abdelbaky et al. 2021; Bobba et al. 2019; Neubauer et al. 2015).

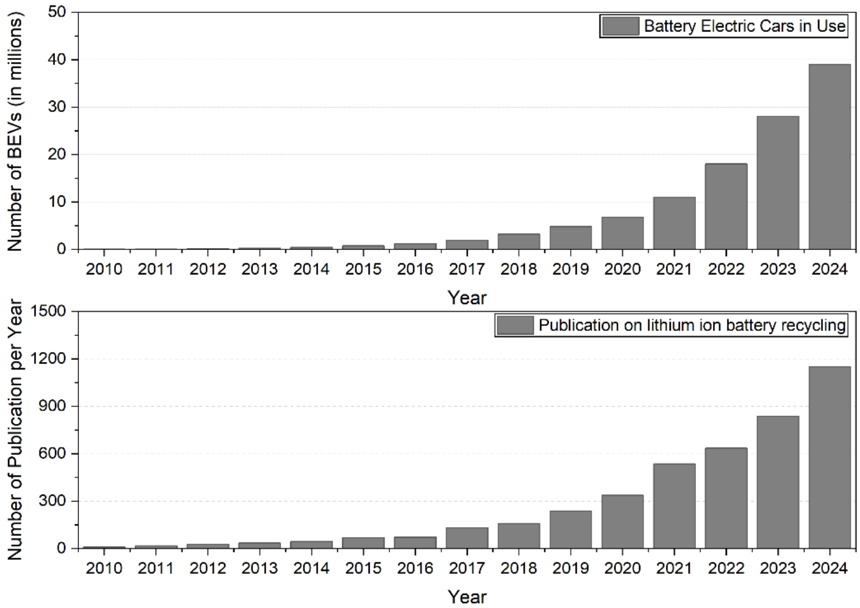

Figure 1 Global number of battery electric cars and number of publications per year on “lithium ion battery recycling”. (Source: Web of Science, Statista).

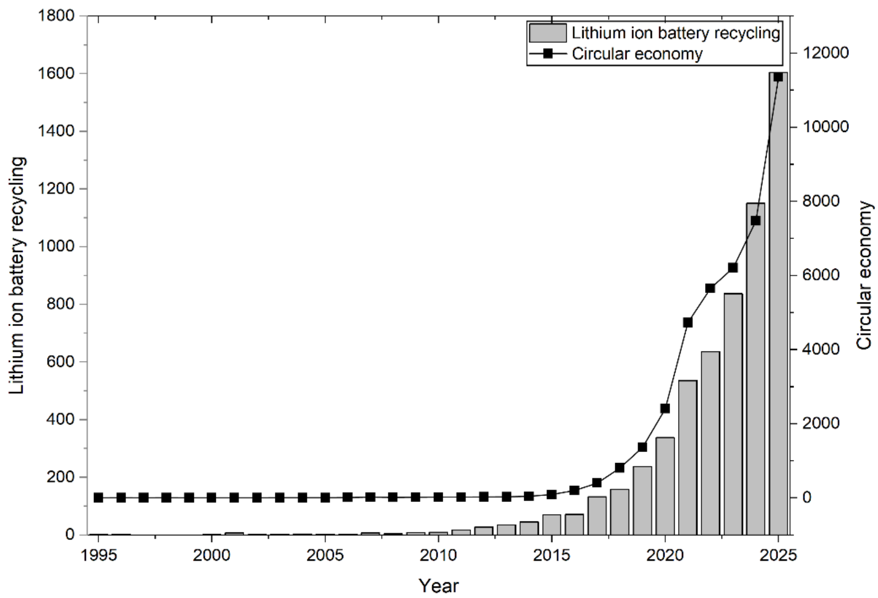

Figure 2 Number of publications per year: “lithium ion battery recycling” and “circular economy” (Source: Web of Science).

The amount of end-of-life LIBs, which contain critical metals such as lithium, nickel, and cobalt, is expected to reach more than 5 million tons by 2030. Therefore, management of spent batteries has emerged as one of the timely issues for governments, policymakers, and industry stakeholders received attention due to growing interest in circular economy and increasing geopolitical uncertainty in material supply chain. (Sopea-Iordache, et al. 2025; Yu, et al. 2022). As an example, EU Battery Regulation in 2023 sets phased mandatory targets for minimum recycled content in new EV batteries to promote circular economy objectives. (EU Regulation 2023/1542)

As illustrated in Figure 2, the number of publications on both circular economy and lithium-ion battery recycling has increased concurrently, showing the close conceptual connection between the two thema. The circular economy suggests the concept of "closing the loop" by framing material and product systems as continuous cycles rather than linear flows. (Ragossnig AM, et al. 2019) Baum et al (2022) examined global recycling techniques trends by analysing 32 LIBs recycling involved firms. However, the study focused on technical aspects than spatial distribution. Previous research has examined the economic characteristics of end-of-life value chains and estimated the corresponding residual value of batteries (Rohr et al. 2017). and investigated different technical processes in LIBs recycling for circular economy (Bae et al. 2021; Velazquez-Martinez, et al. 2019; Li et al. 2018).

The clusters act as localized innovation structures that enable knowledge transfer (Fromhold-Eisebith, 2024; Christopoulos, et al. 2023). Prior studies have explored LIBs recycling clusters with different methods. Xia et al (2026) analysed the evolution of China's innovation network in LIBs recycling using patent data. They reported that eastern China has denser network, and universities and research institutes functioned as intermediaries or hubs within the innovation process. Nguyen-Tien et al. (2022) suggested that the optimal future plant locations for LIBs recycling is in the Midlands and later the East Coast based on techno-economic modelling. Choi et al (2020) reported on current management, policy, and technology in LIBs recycling sector in South Korea. Combining empirical cases with cluster theory in LIBs recycling remain underexplored or only partially addressed. This research gap will be address by using spatial clustering analysis, analytic hierarchy process, and value chain positioning analysis to answer the following research questions:

1. How are lithium-ion battery (LIB) recycling facilities spatially clustered in South Korea?
2. How are emerging clusters geographically distributed?
3. How are LIB recycling facilities positioned within the battery value chain, and how do their functional roles differ across clusters?
4. What factors significantly explain the spatial distribution of battery recycling clusters in South Korea?
    - EV registration density
    - EV infrastructure
    - Industrial recycling concentration
    - Government policy zones
    - Logistics accessibility

The study is structured as follows: Section 2 (Data and method) provides details about the data and methods used to build the research design. Section 3 (Results) presents the mapping, identified clusters, key recycling players, and recycling processes in the value chain. The Section 4 (Discussion) evaluates the key findings and implications. Although recycling and reuse are often treated as a combined concept, this study is limited to the recycling of end-of-life batteries and production scrap into final refined product which could be used again in the production cycle.

2 Data and Method

Data was collected using secondary resources including company official websites, newspapers, KSGA (Korea Smart Grid Association, https://www.ksga.org/eng/index.do), and South Korean government websites: Public Data Portal (https://www.data.go.kr), KIPRIS (Korea Intellectual Property Information Search, https://www.kipris.or.kr), Korean Policy Briefing (https://www.korea.kr), and DART (Data Analysis, Retrieval and Transfer System). Information of population in the region and registered number of EVs were collected from Public Data Portal. Number of chargers in regions was collected from KSGA. Quantitative research on capacity of recycling facilities was chosen to identify key actors engaged in battery recycling activities and research. DART reports of Korean recycling companies were used for qualitative data collection such as their research focus, business and services, as well as quantitative research such as financial information and number of employees. The analysis further examines the geographic distribution of firms and their lithium-ion batteries recycling facilities whether these entities are co-located or geographically dispersed inside south Korea.

This study employs Kernel Density Estimation (KDE) and LISA (Local Indicators of Spatial Association) to identify and assess the spatial clustering patterns of LIB recycling facilities in South Korea. AHP (Analytic Hierarchy Process) is used to derive the relative importance of key factors influencing cluster formation. Finally, mapping visualization is applied to present the spatial distribution, cluster structures, value chain positions in a clear form.

KDE is a method used to estimate the probability density function of variables on observed data. KDE at location (x,y) is defined as:

$$f(x,y) = \frac{1}{nh^2} \cdot \sum_{i=1}^{n} K \cdot \frac{d((x,y),(x_i,x_i)}{h}$$

where n is the number of observations, h is the bandwidth, (x,y) are observed data points in the map as latitude and longitude, and K is a Gaussian function:

$$K(u) = \frac{1}{\sqrt{2\pi}} \cdot e^{\frac{-1}{2} \cdot u^2}$$

The collected numerical data of EV charger and EV adoption were normalized by population and the area to ensure comparability across regions.

$$Density\ of\ EV\ Charger = \frac{Number\ of\ the\ EV\ chargers\ in\ the\ region}{Area\ of\ the\ region\ (km^2)}$$

$$Density\ of\ EV\ adotpion = \frac{Number\ of\ EVs\ in\ the\ region}{Population\ of\ the\ region\ (km^2)}$$

3 Results

3.1 Spatial distribution of EV infrastructure and EV adoption (2020-2025)

Figure 3 & 4 illustrate a significant expansion of electric vehicle (EV) charging infrastructure and EV adoptions in South Korea between 2020 and 2025.

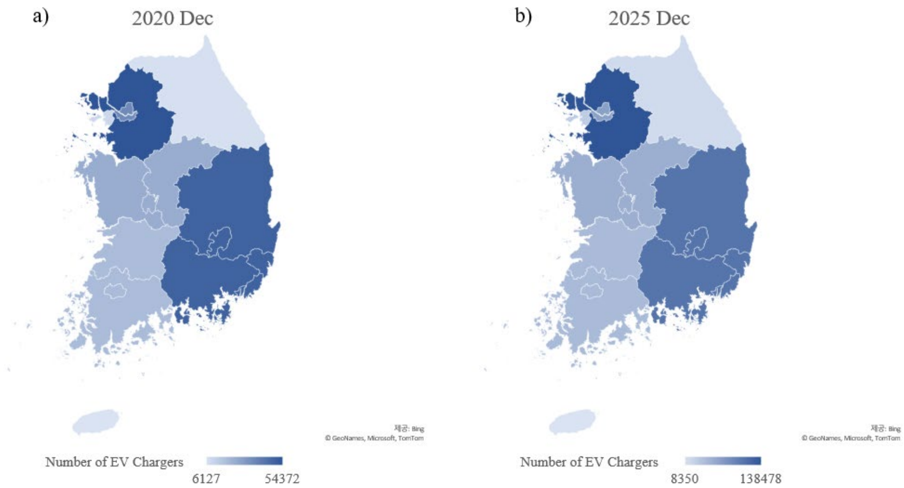

Figure 3 Number of EV Chargers in South Korea.

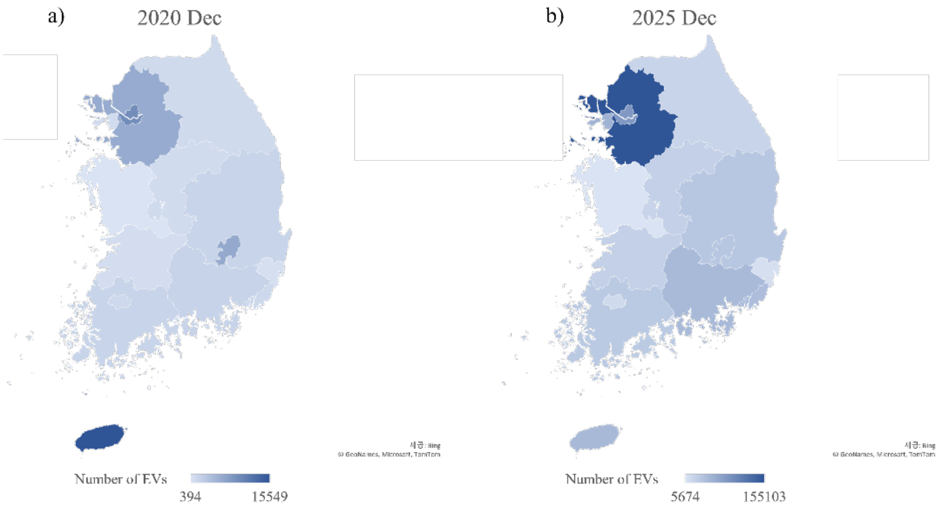

Figure 4 EV Adoptions in South Korea.

From Figure 3, it is shown that the capital area (Seoul, Gyeonggi, and Incheon) and Gyeongsang region exhibited significant more number of EV chargers than other regions. Figure 4.a illustrates that Jeju had significant high number of EV adoptions in 2020. In 2025, due to rapid increase of EV adoption overall in South Korea, the adoption number increased in all regions. As shown in Figure 4.b, the Gyeonggi area showed the highest adoption. As the population and area varies among the regions, normalization was performed for an objective comparison.

3.2 Normalized spatial distribution of EV infrastructure and EV adoption

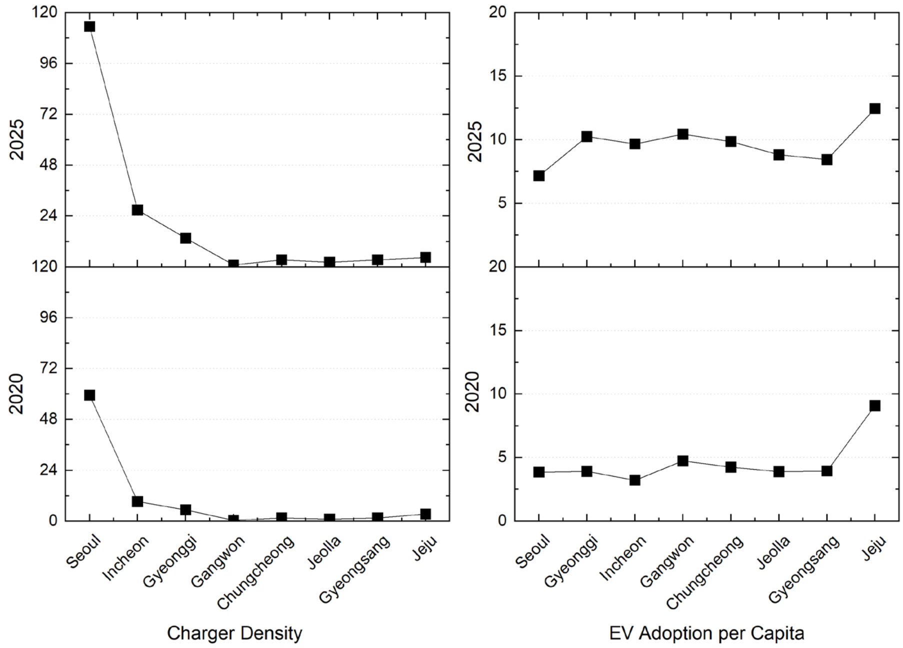

Figure 5 EV chargers density per area (normalized) and EV adoption density per 1000 inhabitants (normalized) between 2020 and 2025.

After normalizing the data, the analysis reveals distinct regional leaders: Seoul exhibits the highest charger density while Jeju maintains the lead in EV adoption per capita. Seoul has the smallest area (605 km^2) among regions, and its urban layout led this high charger density. This discrepancy suggests that although the current infrastructure is most densely packed in the central region (Seoul, Gyeonggi, and Incheon), it does not always linearly correlate with the highest EV adoption, implying the influence of diverse regional factors.

3.2 Spatial distribution of government-led recycling infrastructure & facilities

3.2.1 Future waste resources collection center

Figure 6 shows the government-led LIBs recycling infrastructure. The four black dot represents Future Waste Resources Collection Center (Future Waste Resources Base Collection Center). These centers were established in 2021 by the Ministry of Environment of South Korea and are currently operated by the Korea Environment Corporation. These centers are located in four regional hubs: Seoul metropolitan (Siheung), Chungcheong (Hongseong), Honam (Jeongeup), and Yeongnam (Daegu).

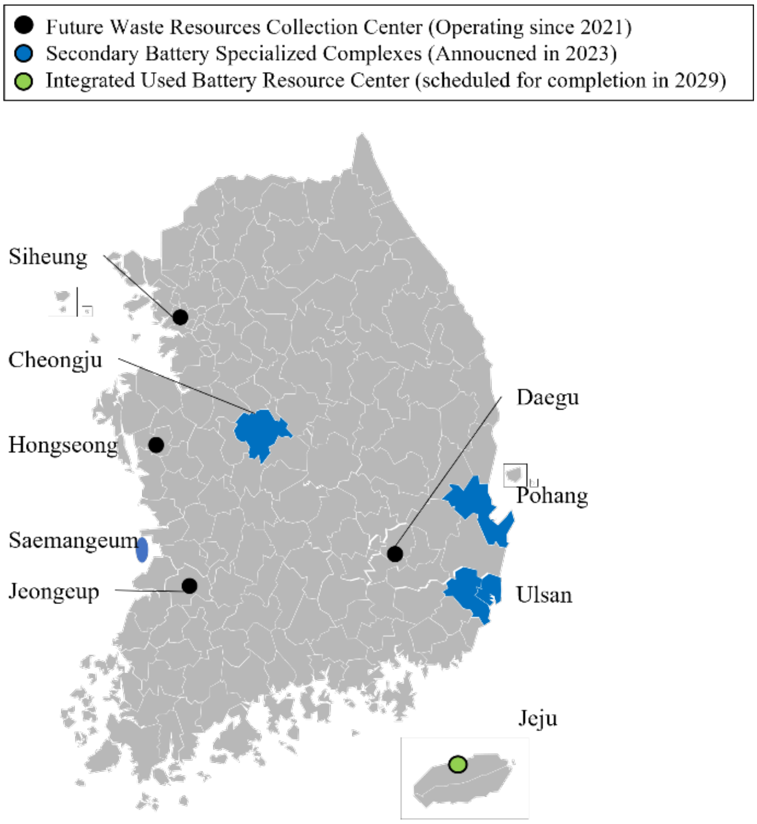

Figure 6 Government-Led Battery Recycling Infrastructure Sites

It began as pilot operations in 2021, then the full operation started in 2022. Their primary objective is to collect, evaluate, and connect end-of-life EV batteries for reuse, remanufacturing, or recycling to achieve a circular economy. These centers were planned to function as a national control hub enabling safe collection and assessment of battery residual value. EVs registered before 2021 that received government subsidies were required to return their batteries to the government upon decommissioning.

As shown in Figure 8, a total of 3,733 electric vehicle batteries had been collected, of which 2,126 were supplied to companies and research institutes to support and promote the development of reuse and recycle related industry.

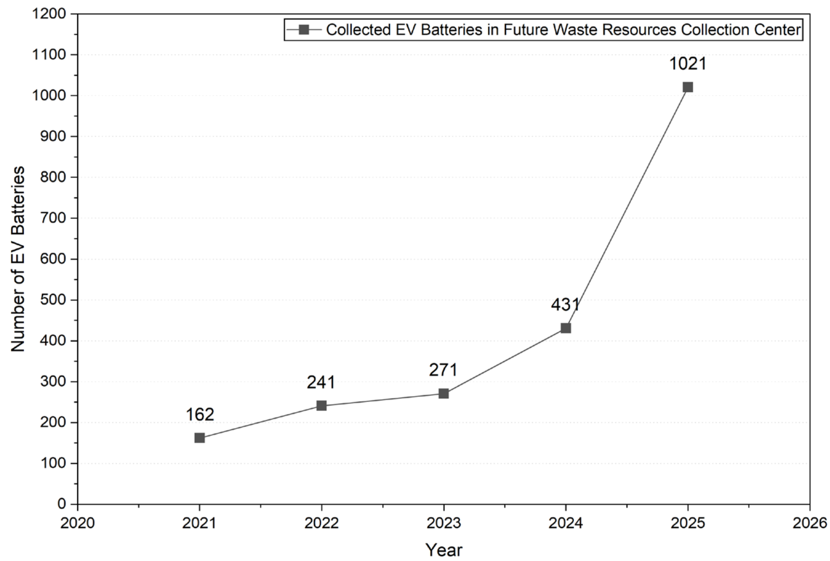

Figure 7 Number of collected used batteries in Future Waste Resources Collection Center (Source: Press release from the Ministry of Climate, Energy and Environment)

3.2.2 Secondary battery specialized complexes

Blue marked areas in Figure 6 represents secondary battery specialized complex in South Korea. These complexes were designated in 2023 as part of the government's strategy to foster secondary batteries industries. It aims for different regional roles within the national battery value chain strategy. Pohang focuses on advanced materials and next generation battery technologies. Saemangeum aims for industrial scale production of battery materials and recycling activities. Ulsan and Cheongju respectively emphasize battery cell production development. These complexes receive policy incentives, including corporate tax reductions, investment tax credits, and exemptions or reductions in land leasing fees. In addition, the regulatory processes are simplified, permitting processes are expedited, and infrastructure support such as electricity, water, and logistics.

3.2.3 Integrated Used Batteries Resources Center

The Integrated Used Battery Resource Centers in Jeju began as a pilot in 2019 and became operational in 2020. They are operated with Jeju Technopark for end-of-life EV batteries collection, assessment, and management for reuse and recycling. However, due to the absence of pretreatment firms, collected used batteries have been transported to the South Korea mainland. Further recycling steps are handled by other firms. The center planned for expansion by 2029.

3.2.4 Lithium ion batteries recycling process steps

Based on a comprehensive review of existing literature, Figure 8 provides a simplified illustration of the LIB recycling process and its value chain positions. The upstream steps are collection, assessment, and pretreatment for both end-of-life batteries and production scraps. The downstream steps focus on material recovery through hydrometallurgy and refining processes. Due to low investment cost and comparative simple process, the number of firms involved in upstream activities were higher than that of firms involved in downstream recyclers. Below Table 1 provides the explanation of the steps.

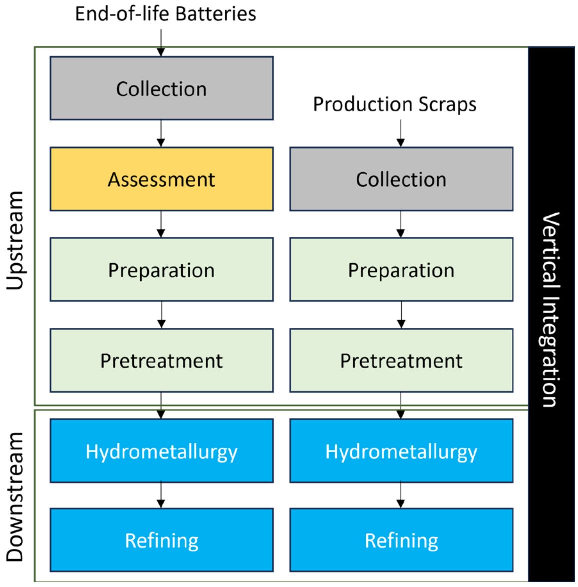

Figure 8 Simple scheme for LIBs recycling process steps (Baum et al 2022; Velazquez-Martinez, et al. 2019)

Table 1 Key process stages in lithium-ion battery recycling

Recycling Steps	*Recycling Processes*
Transport/Collection	Transportation of end-of-life batteries or production scraps
Assessment	Assess the value and status of end-of-batteris
Preparation	Disassembly and/or discharge batteries prior to subsequent recycling processes
Pretreatment	Separation of battery components and production of black mass through mechanical and/or thermal treatment
Hydrometallurgy	Recovery of valuable metals via hydrometallurgical processes including leaching, solvent extraction, crystallization, etc.
Waste Treatment	Treatment of wastewater, off-gas, and solid residues

Source: Baum et al 2022; Velazquez-Martinez, et al. 2019

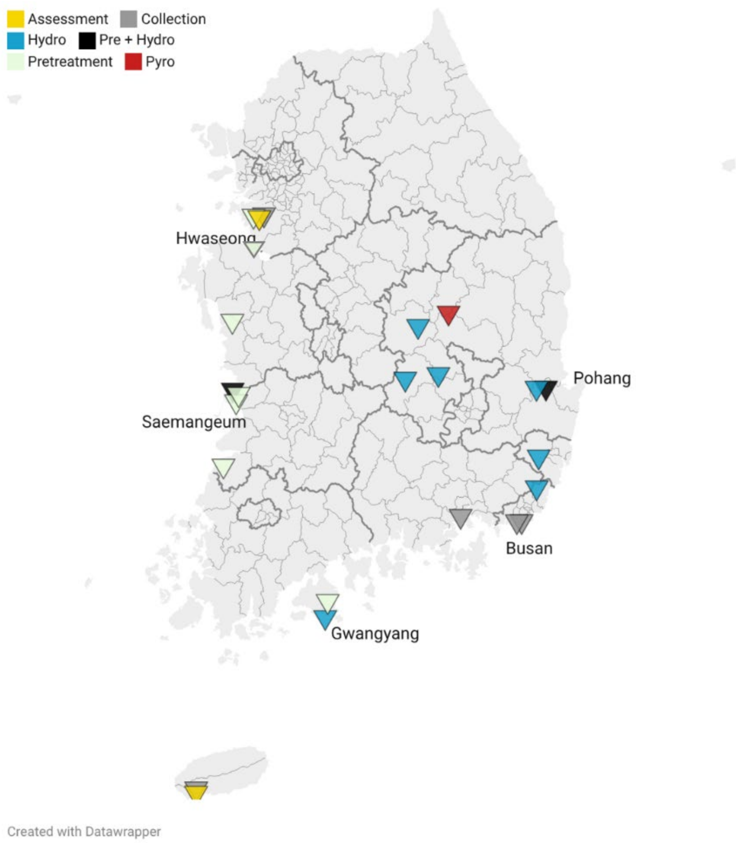

Figure 9 Recycling firms by recycling routes

Figure 9 shows the recycling firms with different recycling routes. Except for the 3 hydrometallurgical process handling plant in the middle, the other hydrometallurgy process involving plants are located in the coast. It suggests that as hydrometallurgy and refining process requires wastewater treatment, firms were often located in the coast area. Gangwon region, where showed relatively low EV numbers and low infrastructure density in Section Figure 3&4, there were no recycling companies or relevant government institutions located in the region.

4 Discussion

Specialized zones host companies; however, it remains unclear whether these clusters are primarily government-fostered or industry-led. For instance, Saemangeum has recently seen the construction of new plants from Sungeel Hitech, suggesting that policy measures and incentives have played a role in attracting firms. However, the two city, Ulsan and Pohang, they have different context. Ulsan has long been an automotive industry driven city with Hyundai automotive group, while Pohang developed historically around the steel industry with Posco. The recyclers in these cities were existing in the city before the city was chosen as a specialized zones.

While South Korea entered the battery recycling sector later than China and Japan, the government is supporting the industry by a strategic dual track to leverages both established industrial hubs and newly designated strategic hub. It implies that the South Korean government has designated existing strong industrial cities, such as Pohang and Ulsan. Additionaly, the Saemangeum region is being developed as a new cluster for secondary battery.

References and Notes

Ghosh, Aritra. "Possibilities and Challenges for the Inclusion of the Electric Vehicle (EV) to Reduce the Carbon Footprint in the Transport Sector: A Review." Energies 13, no. 10 (2020): 2602. https://www.mdpi.com/1996-1073/13/10/2602.

Șopea-Iordache, Andreea M., Duica, Mircea Constantin, Muresan, Jianu Daniel, and Pascu, Alina Nicoleta. "Circular Economy as a Strategic Response to Geopolitical Volatility: Global Management Pathways." 2026.

Yu, Xiaolu, Li, Weikang, Gupta, Varun, Gao, Hongpeng, Tran, Duc, Sarwar, Shatila, and Chen, Zheng. "Current Challenges in Efficient Lithium-Ion Batteries' Recycling: A Perspective." Global Challenges 6, no. 12 (2022): 2200099. https://onlinelibrary.wiley.com/doi/full/10.1002/gch2.202200099.

Velázquez-Martínez, Omar, Valio, Johanna, Santasalo-Aarnio, Annukka, Reuter, Markus, and Serna-Guerrero, Rodrigo. "A Critical Review of Lithium-Ion Battery Recycling Processes from a Circular Economy Perspective." Batteries 5, no. 4 (2019): 68.

Bae, Hyuntae, and Kim, Youngsik. "Technologies of lithium recycling from waste lithium ion batteries: a review." Materials Advances 2, no. 10 (2021): 3234–3250. https://pubs.rsc.org/en/content/articlehtml/2021/ma/d1ma00216c.

Li, Li, Zhang, Xiaoxiao, Li, Matthew, Chen, Renjie, Wu, Feng, Amine, Khalil, and Lu, Jun. "The Recycling of Spent Lithium-Ion Batteries: a Review of Current Processes and Technologies." Electrochemical Energy Reviews 1, no. 4 (2018): 461–482. https://link.springer.com/article/10.1007/s41918-018-0012-1#citeas.

Nguyen-Tien, Viet, Dai, Qiang, Harper, Gavin D.J., Anderson, Paul A., and Elliott, Robert J.R. "Optimising the geospatial configuration of a future lithium ion battery recycling industry in the transition to electric vehicles and a circular economy." Applied Energy 321 (2022): 119230. https://www.sciencedirect.com/science/article/pii/S0306261922005943.

Xia, Wei, Zheng, Shiyi, Qiu, Liping, Hu, Hao, Chen, Yufeng, Wei, Shaobin, and Zhou, Haiyan. "Evolution of the Innovation Network of Lithium-Ion Battery Recycling Technologies in China from the Perspective of Patents." Polish Journal of Environmental Studies 35, no. 2 (2026): 2903–2916. https://www.pjoes.com/Evolution-of-the-Innovation-Network-of-nLithium-Ion-Battery-Recycling-Technologies,203046,0,2.html.

Baum, Zachary J., Bird, Robert E., Yu, Xiang, and Ma, Jia. “Lithium-Ion Battery Recycling─Overview of Techniques and Trends.” ACS Energy Letters 7, no. 2 (2022): 712–719.

Saaty, T.L. (1980) The Analytic Hierarchy Process. New York: McGraw-Hill.

Porter, M.E. (1998) ‘Clusters and the new economics of competition’, Harvard Business Review, 76(6), pp. 77–90.

Malczewski, J. (2006) ‘GIS-based multicriteria decision analysis: a survey of the literature’, International Journal of Geographical Information Science, 20(7), pp. 703–726.

Feng, Z. and Yan, N. (2007) 'Putting a circular economy into practice in China', Sustainability Science, 2(1), pp. 95-101. doi:10.1007/s11625-006-0018-1

Rheinland, T. Ü. “EU New Battery Regulation (EU) 2023/1542 | TÜV Rheinland.” 2026. https://www.tuv.com/landingpage/en/eu-new-battery-regulation-eu-2023-1542/, accessed May 2026.

Xu, J., Thomas, H.R., Francis, R.W., Lum, K.R., Wang, J. & Liang, B. (2008) 'A review of processes and technologies for the recycling of lithium-ion secondary batteries', Journal of Power Sources, 177(2), pp. 512-527. doi:10.1016/j.jpowsour.2007.11.074

Zott, C. & Amit, R. (2010) 'Business model design: an activity system perspective', Long Range Planning, 43(2-3), pp. 216-226. doi:10.1016/j.lrp.2009.07.004

Tsujimoto, M., Kajikawa, Y., Tomita, J. & Matsumoto, Y. (2018) 'A review of the ecosystem concept - Towards coherent ecosystem design', Technological Forecasting and Social Change, 136, pp. 49-58. doi:10.1016/j.techfore.2017.06.032

Choi, Y. & Rhee, S.-W. (2020) 'Current status and perspectives on recycling of end-of-life battery of electric vehicle in Korea (Republic of)', Waste Management, 106, pp. 261-270. doi:10.1016/j.wasman.2020.03.015

Wesselkämper, J. & von Delft, S. (2024) 'Current status and future research on circular business models for electric vehicle battery recycling', Resources, Conservation and Recycling, 206, Article 107596. doi:10.1016/j.resconrec.2024.107596

Ragossnig AM, Schneider DR. (2019) 'Circular economy, recycling and end-of-waste', Waste Management & Research: The Journal for a Sustainable Circular Economy, 37(2), pp. 109-111. doi:10.1177/0734242X19826776

Geissdoerfer, Martin, Savaget, Paulo, Bocken, Nancy M.P., and Hultink, Erik Jan. “The Circular Economy – A new sustainability paradigm?” Journal of Cleaner Production 143 (2017): 757–768.

Rezaei, Mina, Nekahi, Atiyeh, Kumar M R, Anil, Nizami, Ameer, Li, Xia, Deng, Sixu, Nanda, Jagjit, and Zaghib, Karim. "A review of lithium-ion battery recycling for enabling a circular economy." Journal of Power Sources 630 (2025): 236157.

Harper, Gavin, Sommerville, Roberto, Kendrick, Emma, Driscoll, Laura, Slater, Peter, Stolkin, Rustam, Walton, Allan, Christensen, Paul, Heidrich, Oliver, Lambert, Simon, Abbott, Andrew, Ryder, Karl, Gaines, Linda, and Anderson, Paul. "Recycling lithium-ion batteries from electric vehicles." Nature 575, no. 7781 (2019): 75–86. https://www.nature.com/articles/s41586-019-1682-5.

Statista. "Battery electric vehicles in use worldwide 2010-2024 (in millions)." 2025, accessed April 2026. https://www.statista.com/statistics/270603/worldwide-number-of-hybrid-and-electric-vehicles-since-2009/

Web of Science, "Circular economy." accessed on 27 April 2026. https://www.webofscience.com/wos/woscc/summary/61931427-af45-4b41-9687-eac6a9b5c2d1-01b1803cfe/6697faab-972c-4d1a-a116-b7c636c447a8-01b1803cf0/relevance/1

Web of Science, "Lithium ion batteries." accessed on 27 April 2026. https://www.webofscience.com/wos/woscc/summary/5f669618-51d7-4987-9c5f-673018b91d4e-01b180dfe3/df4383a8-6f3f-465c-84bb-dab44f81e138-01b180dfd3/relevance/1

Boschma, R., & Frenken, K. (2010). The spatial evolution of innovation networks. A proximity perspective. In R. Boschma & R. Martin (Eds.), Handbook of evolutionary economic geography. Cheltenham: Edward Elgar Publishing.

Zaino, Rami, Ahmed, Vian, Alhammadi, Ahmed Mohamed, and Alghoush, Mohamad. "Electric Vehicle Adoption: A Comprehensive Systematic Review of Technological, Environmental, Organizational and Policy Impacts." World Electric Vehicle Journal 15, no. 8 (2024): 375.

Neubauer, Jeremy S., Wood, Eric, and Pesaran, Ahmad. "A Second Life for Electric Vehicle Batteries: Answering Questions on Battery Degradation and Value." SAE International Journal of Materials and Manufacturing 08, no. 2 (2015): 544–553. https://saemobilus.sae.org/articles/a-second-life-electric-vehicle-batteries-answering-questions-battery-degradation-value-2015-01-1306#citation.

Abdelbaky, Mohammad, Peeters, Jef R., and Dewulf, Wim. "On the influence of second use, future battery technologies, and battery lifetime on the maximum recycled content of future electric vehicle batteries in Europe." Waste management (New York, N.Y.) 125 (2021): 1–9. https://doi.org/10.1016/j.est.2025.119694.

Bobba, Silvia, Mathieux, Fabrice, and Blengini, Gian Andrea. "How will second-use of batteries affect stocks and flows in the EU? A model for traction Li-ion batteries." Resources, Conservation and Recycling 145 (2019): 279–291. https://www.sciencedirect.com/science/article/pii/S0921344919300795.

Rohr, Stephan, Wagner, Stephan, Baumann, Michael, Muller, Stefan, and Lienkamp, Markus. (2017) "A techno-economic analysis of end of life value chains for lithium-ion batteries from electric vehicles," 2017 Twelfth International Conference on Ecological Vehicles and Renewable Energies (EVER), Monte Carlo, Monaco, 2017, pp. 1-14, doi: 10.1109/EVER.2017.7935867.

Yoo, Kyoungkeun. "Lithium Ion Battery Recycling Industry in South Korea." Resources Recycling 32, no. 1 (2023): 13–20. https://j-kirr.or.kr/articles/article/POBv/#References.

"기후에너지환경부 보도자료 - 미래폐자원 거점수거센터 운영 강화... 전기차 폐배터리 민간 공급 확대." 2026. https://mcee.go.kr/home/web/board/read.do?pagerOffset=210&maxPageItems=10&maxIndexPages=10&menuId=10598&boardId=1837960&boardMasterId=939, accessed May 2026.

The Asia Business Daily. "POSCO E&C, Proven EPC Capabilities… Establishing Core Material Value Chain for Secondary Batteries - The Asia Business Daily." https://www.asiae.co.kr, 2023. https://www.asiae.co.kr/en/article/2023121813371831656, accessed May 2026.

"EcoPro." 2026. https://ecopro.co.kr/eng/sub010101, accessed Apr 2026.

"Charge Info 차지인포." 2026. https://chargeinfo.ksga.org/front/statistics/charger, accessed May 2026.

Chen, Hongxia, Yu, Jeongsoo, and Liu, Xiaoyue. "Development Strategies and Policy Trends of the Next-Generation Vehicles Battery: Focusing on the International Comparison of China, Japan and South Korea." Sustainability 14, no. 19 (2022): 12087. https://www.mdpi.com/2071-1050/14/19/12087.

Li, Shanjun, Zhu, Xianglei, Ma, Yiding, Zhang, Fan, and Zhou, Hui. "The Role of Government in the Market for Electric Vehicles: Evidence from China." Journal of Policy Analysis and Management 41, no. 2 (2022): 450–485. https://onlinelibrary.wiley.com/doi/10.1002/pam.22362.

Zhao, Yanyan, Pohl, Oliver, Bhatt, Anand I., Collis, Gavin E., Mahon, Peter J., Rüther, Thomas, and Hollenkamp, Anthony F. "A Review on Battery Market Trends, Second-Life Reuse, and Recycling." Sustainable Chemistry 2, no. 1 (2021): 167–205. https://www.mdpi.com/2673-4079/2/1/11.

Public Data Portal. 2026 https://www.data.go.kr/index.do, accessed Apr 2026

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