

# Li-ion battery recycling, a catalyzer to proper waste regulation<sup>1</sup>

## OUTLINES:

- The Li-ion<sup>2</sup> battery recycling market is mainly driven by the booming EV<sup>3</sup> market.
- Yole Développement (Yole) expects about 705,000 tons of end-of-life Li-ion batteries by 2025. This figure should hit 9 million tons per year by 2040.
- The total Li-ion battery recycling market was about 93,800 tons in 2019. Yole's analysts announce a 30% CAGR<sup>4</sup><sub>2019-2025</sub>, to reach 459,369 tons at the end of the period.
- Value of raw materials present in Li-ion batteries going for recycling is today around US\$315 million. According to Yole's Li-ion batteries report, this figure will reach up to US\$1,137 million by 2025 and US\$23,812 million by 2040.
- The Li-ion battery recycling market is growing and attracting more players.
- Battery recycling supply chain: companies involved in various levels are interlinked with each other.

*“Li-ion batteries are widely used in consumer goods, electric and hybrid electric vehicles, stationary energy storage and other applications.” asserts **Shalu Agarwal, PhD. Power Electronics and Materials Analyst at Yole Développement (Yole)**. “Rapid growth in the electric vehicle market is crucial to solve the looming climate crisis and to meet the global target of reduced carbon dioxide emission. However, growing numbers of electric vehicles present a serious waste-management challenge for Li-ion battery recyclers at end-of-life. As the popularity of electric vehicles grows explosively, so does the pile of end-of-life lithium-ion batteries that once powered those environmentally friendly cars”.*

According to Yole's analysts, there will be about 705,000 tons of end-of-life Li-ion batteries by 2025, and by 2040 they will hit 9 million tons per year. Currently, only a small portion of Li-ion batteries are recycled, and the rest are unfortunately going to landfill. The total Li-ion battery recycling market was about 93,800 tons in 2019, which will grow to 459,369 tons by 2025 with a CAGR between 2019 and 2025 of 30 %.

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<sup>1</sup> Extracted from: Lithium-ion battery recycling Market & Technology trends 2020, Yole Développement, 2020

<sup>2</sup> Li-ion: Lithium-ion

<sup>3</sup> EV: Electric Vehicles

<sup>4</sup> CAGR: Compound Annual Growth Rate

In this dynamic context, Yole investigates disruptive technologies and related markets. The market research and strategy consulting company points out the latest innovations and underline the business opportunities.

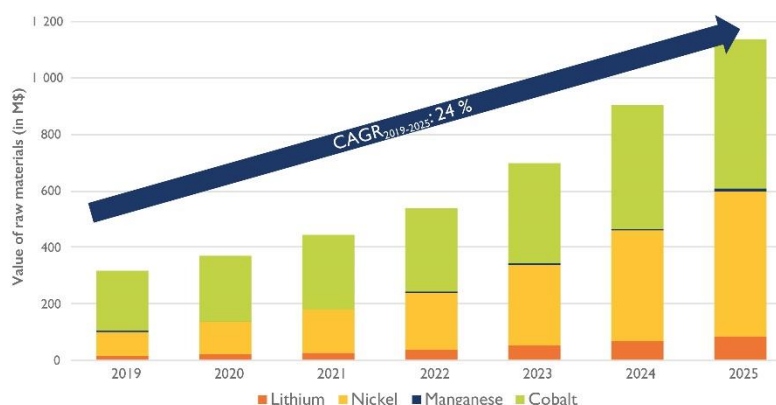
Released today, the Lithium-ion battery recycling Market & Technology trends 2020 report gives a detailed analysis of the different Li-ion battery recycling technologies. This new report is part of the significant collection of battery reports performed by Yole’s analysts. It provides market value of raw materials and market size of rechargeable Li-ion battery recycling for consumer goods, e-mobility, stationary storage, and other applications. It also gives insights into different Li-ion cell technologies, related technology trends and their impact on battery recycling market. Including market trends and forecasts, supply chain, technology trends, take away and outlook, this study also points out market opportunities for players that can pack and transport the end-of-life batteries.

This new report aims to demonstrate the strong, consistently growing business potential of Li-ion battery recyclers and players involved in Li-ion batteries’ second-life applications. In addition, this study provides the Li-ion battery recycling supply chain landscape, including the key players for battery cells, battery packs, Li-ion battery recycling, and associated business models.

What are the economic and technological challenges related to the Li-ion battery recycling? What are the key market drivers? Who are the suppliers to watch, and what innovative technologies are they working on? Yole presents today a comprehensive overview of the Li-ion battery recycling industry.

### 2019-2025 value of raw materials present in Li-ion batteries going for recycling (in \$ million)

(Source: Lithium-ion Battery Recycling Market & Technology Trends 2020 report, Yole Développement, 2020)



As analyzed by Yole’s team in the new Lithium-ion battery recycling Market & Technology trends 2020 report, the primary source of waste batteries is the end of-life batteries especially in the case of consumer goods. However, manufacturing scrap generated

during the manufacture of Li-ion cells has also a non-negligible share. In the case of e-mobility, manufacturing scrap has a significant share of the total Li-ion recycling market. Therefore, in their Li-ion battery recycling market forecast model, Yole’s analysts have included the shares of manufacturing scrap generated during the production of cells, end-of-life Li-ion batteries, and end-of-second-life Li-ion batteries.

According to **Milan Rosina, PhD, Principal Analyst, Power Electronics and Batteries, at Yole**: “Recycling of end-of-life batteries can provide an opportunity for the battery recyclers to recover the valuable materials which make up the battery. The total value of raw materials present in end-of-life Li-ion batteries, is around US\$921 million and will reach up to US\$1,960 million by 2025 and US\$26,381 million by 2040. As only a few percent of Li-ion batteries are recycled, the value of raw materials present in Li-ion batteries going for recycling is around US\$315 million, which will reach up to US\$1,137 million by 2025 and US\$23,812 million by 2040”.

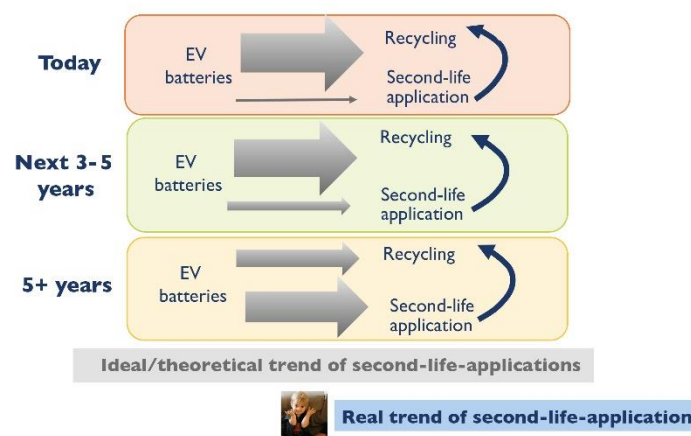
Li-ion battery recycling is a dynamic and attractive industry, for sure. “With the rapid adoption of EVs, the demand for Li-ion batteries as well as Li-ion battery recycling will grow significantly in the coming decades”, comment Yole’s analysts in this report.

Currently, most of the recycling companies are located in China, for example: Brunp, Huayou Cobalt, GEM, and Europe, such as Umicore, Akkuser, Accurec. Chinese recycling companies are at an advantage. They benefit from an already large battery market, enjoy extensive support from the state and have good access to the high volume of material to be recycled.

Most of the recycling companies are gradually increasing their recycling capacity to accommodate the growing volume of end-of-life batteries. Still, it again depends on the investment required to increase the capacity.

## Second-life applications-trend

(Source: Lithium-ion Battery Recycling Market & Technology Trends 2020 report, Yole Développement, 2020)



To build a new recycling plant or increase the capacity of an existing plant needs high investment. High investment, the right strategies, and the rapid increase of recycling capacity are the key. Recycling players with high investment capability and the right approach may benefit. Therefore, today's smaller players or newcomers can increase their market shares, and the leaders can see their market shares decreasing, all depending on their approach.

**For Shalu Agarwal from Yole:** *“As automotive makers are obliged to recycle their end-of-life batteries, most of the automotive makers are already evaluating different recycling companies and seeking the best battery recycling partners for their vehicles, like the partnership between Honda and SNAM or Audi's and MG Motors' partnership with Umicore. The environmental criteria related to the recycling methods (pyrometallurgical, hydrometallurgical), various process steps and chemicals used, and the recycling capacity are amongst the most important evaluation factors”.*

The Li-ion battery recycling market is growing and attracting more and more players. Yole' analysts invite you to dive deep into this industry and get a clear understanding of technology status and possible evolutions.



All year long, Yole Développement publishes numerous reports and monitors related to the batteries industry. In addition, experts realize various key presentations and organize key conferences. In this regard, do not miss the upcoming Li-ion Battery Recycling: Burden or New Business Opportunity? – Webcast on July 30th. Save the date & register today on i-Micronews. Make sure to be aware of the latest news coming from the industry and get an overview of our activities, including interviews with leading companies and more on i-Micronews. Stay tuned!

### Press contacts

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### About our analysts

**Shalu Agarwal, PhD.** is Power Electronics and Materials Analyst at Yole Développement (Yole), within the Power & Wireless division. Based on Seoul, Shalu is engaged in the development of technology & market reports as well as the production of custom consulting studies. Shalu has more than 10 years' experience in Electronic Material Chemistry. Before joining Yole, she worked as a project manager and research professor in the field of electronic materials, batteries and inorganic chemistry. Shalu Agarwal received her master's and Ph.D. degree in Chemistry from the Indian institute of Technology (IIT) Roorkee (India).

**Milan Rosina, PhD,** is Principal Analyst, Power Electronics and Batteries, at Yole Développement (Yole), within the Power & Wireless division. He is engaged in the development of the market, technology and strategic analyses dedicated to innovative materials, devices and systems. His main areas of interest are EV/HEV, renewable energy, power electronic packaging and batteries. Milan has 20 years of scientific, industrial and managerial experience involving equipment and process development, due diligence, technology, and market surveys in the fields of renewable energies, EV/HEV, energy storage, batteries, power electronics, thermal management, and innovative materials and devices. He received his PhD degree from Grenoble Institute of Technology (Grenoble INP) in France. Milan Rosina previously worked for the Institute of Electrical Engineering in Slovakia, Centrotherm in Germany, Fraunhofer IWS in Germany, CEA LETI in France, and utility company ENGIE in France.

### About the report

#### **Lithium-ion battery recycling Market & Technology trends 2020**

*The value of Lithium-ion battery recycling will be catalyzed by proper waste regulation.* – Performed by Yole Développement

#### **Companies cited:**

Alabama Graphite, Accurec, American Manganese, Amperex Technology Ltd, Adstec, Albemarle, Altairnano, Apl, Aoyu Graphite Group, Ambatovy, Alelion, Accumotive, Ahola Transport, BYD, BMZ, BorgWarner, BTR, Brunp Recycling, BAK Shenzhen BAK Battery Co. Ltd., Batrec, Clarios, CALB, CATL, Chilwee, CMA CGM, China Baoan Group, Draxlmaier, Duesenfeld, Dowa Eco-system, Envirostream, EAS, Ecosurety, Electrova, Electric Power Research Institute, EasyLi, Envision AESC, Fortum, Friwo, Freeport-McMoRan, Fangda Carbon New Material, Freeport-Cobalt, Focus Graphite, FMC, Forsee, Fluence, Genius, GS Yuasa, Galaxy, GEM, Glencore, Ganfeng Lithium, Huayou Cobalt, Hanrui Cobalt, Hitachi and more...

#### **Related reports:**

- [Power Electronics for Electric & Hybrid Electric Vehicles 2020](#)
- [Li-ion Battery Packs for Automotive and Stationary Storage Applications 2020](#)
- [Status of Rechargeable Li-ion Battery Industry 2019](#)

#### **About Yole Développement**

Founded in 1998, Yole Développement (Yole) has grown to become a group of companies providing marketing, technology and strategy consulting, media and corporate finance services, reverse engineering and reverse costing services and well as IP and patent analysis. With a strong focus on emerging applications using silicon and/or micro manufacturing, the Yole group of companies has expanded to include more than 80 collaborators worldwide... [More](#)

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