

EV batteries: the green option that could be greener

1 Warmer

a. Discuss the questions.

- Are there many electric vehicles (EVs) on the roads where you live?
- What are the benefits of EVs?
- What are the obstacles to more people switching to EVs?
- What do you know about the recycling of EV parts?

2 Reading for gist

a. Skim the article and choose the main idea.

- a. Battery recycling rates are falling in Europe, where no materials must be recycled.
- b. China is now a dominant player in the EV supply chain.
- c. Start-ups are trying to develop an alternative to current EV battery disposal that means more accessible and greener recycling.

3 Key words

a. Write the words from the box next to the definitions below. Check your answers and your understanding of the words by using them to complete the example sentence after each definition. Then read the complete article to see how each of the key words is used in context.

behemoth	counterpart	downturn	durability	exceed	operational
regulation	scale	supply chain	surge	tackle	viable

1. a significant and sudden increase _____

There was a 53% _____ in the retail company's shares after the buy-out offer was made public.

2. a rule or the act of controlling something _____

Many companies struggle to comply with ever-changing data protection _____.

3. able to succeed _____

We are not sure if our current strategy will be _____ in a foreign market.

4. a thing that has the same purpose as another _____

Successful in several Asian countries, the dating app start-up acquired its European _____.

5. be greater than another amount _____

We are still not sure if pay increases will _____ inflation this year.

6. a reduction in the amount of something _____

Experts forecast a _____ in the commercial property market.

7. something substantial and powerful _____

The ride-sharing _____, Uber is facing strong competition from its rivals.

8. try to deal with something _____

They have hired consultants to help them _____ new sustainability challenges.

9. the quality of lasting a long time without becoming damaged _____

The _____ of a product and its components is crucial to a circular economy in which materials never become waste.

10. working or ready to work correctly _____

According to their business plan, they will be fully _____ in three cities in just five years.

11. the size of something, especially when it is large _____

The system worked very well with under 10,000 users but crashed when it was rolled out at a larger _____.

12. the system of things and people involved in the process of getting a product from where it is made to the person who buys it _____

At the beginning of the pandemic, there were several disruptions in the _____, and many greengrocers' shelves stood empty.

Tech start-ups race to make EV battery recycling sustainable

INDUSTRY ANTICIPATES SURGE IN DISPOSALS AS FIRST BATCH OF ELECTRIC VEHICLES NEARS END OF 10-YEAR LIFE CYCLE

ELEANOR OLCOTT AND GLORIA LI

11 NOVEMBER, 2023

- 1 Technology start-ups are racing to make recycling electric-vehicle batteries cleaner and more economical, with investors pouring billions of dollars into recycling facilities globally to prepare for a surge in disposed packs and for regulations mandating minimum recycled content in new EV batteries.
- 2 With the first batch of electric cars nearing the end of their roughly 10-year lifespan, traditional recycling methods for lithium-ion batteries that power EVs are highly energy-intensive and involve burning used batteries at more than 1,400C.
- 3 A clutch of start-ups, including Hong Kong's GRST and Oregon-based OnTo Technology, as well as larger companies such as German chemicals giant BASF, are working on a water-based technology seen as a commercially viable and environmentally friendly alternative.
- 4 "Lithium-ion batteries were not developed for recycling. The packs in EV cars are a nightmare," said Wojciech Mrozik, an expert on battery recycling at Newcastle University. "They are not unified and have foams and glue, which require huge manual labour to separate."
- 5 Water-based binders were "the future", he said, adding that they were "less environmentally aggressive" than their chemical counterparts and required "less aggressive methods to recover the metals".
- 6 Global investment in battery-related start-ups this year – which reached \$9.2bn by September, according to Crunchbase data – is set to exceed the preceding two years, defying a broader downturn in tech investment. Battery-related start-ups collectively raised \$7.8bn in 2022, down from \$12bn in 2021.
- 7 Most lithium-ion batteries use toxic chemicals to bind the metals to electrodes. The typical recycling method involves smelting discarded batteries or dissolving them in harsh chemicals to remove the binder and recover metals such as cobalt, nickel and copper as a metal alloy.
- 8 Under the process developed by Hong Kong's GRST, which is backed by the founder of Taiwanese chipmaker Realtek Semiconductor and Hong Kong garment behemoth TAL Apparel, the used batteries can be dissolved in water to obtain the so-called black mass of valuable metals that make up the cathodes and anodes.
- 9 GRST, a winner of this year's Earthshot prize for innovations to tackle climate challenges, hopes to raise \$50mn in the next two years to increase production at the battery plant it co-owns in Zhejiang province. In the long term, GRST hopes to lease its water-based binder and recycling technology to other battery makers.
- 10 Past attempts to commercialise water-based binders have failed because of poor battery performance. "In the past water-based solvents have not been as stable as chemical solvents," said GRST co-founder Justin Hung.
- 11 Studies have shown that water-based binders can cause corrosion, but Hung said GRST had overcome this problem. Its batteries perform well in terms of energy density, safety and durability compared with chemical-based counterparts, according to its own customer tests.
- 12 OnTo Technology, a recycling start-up in Oregon, has started commercial tests of a water-based binder developed by scientists at Lawrence Berkeley National Laboratory. BASF invested in water-based binder production at two of its factories in China this year.
- 13 Experts said low recycling rates – less than 5 per cent of used lithium-ion batteries are recycled in the US – were a result of lack of investment and regulation. Most lithium-ion batteries are sent to waste management facilities or landfills, where the toxic chemicals in the binder can cause fires or leak into water systems.

Continued on next page

- 14 “Recycling hasn’t been a top priority for the industry so far. The existing technology for recycling lithium-ion batteries is not operational at scale,” said Sarah Montgomery, co-founder and chief executive of Infyos, a battery supply chain technology company.
- 15 But the tide was beginning to shift, she said, pointing to regulatory changes spearheaded by the European Union to increase battery recycling rates and make the process more sustainable.
- 16 In July, the European Council adopted the “battery passport”, which will introduce a mandatory minimum level of recycled materials for EV and industrial batteries by 2031.
- 17 The changes come as demand for batteries is rising in line with increasing use of electric vehicles. McKinsey analysts forecast that the value of the entire lithium-ion battery supply chain will increase annually by 30 per cent from 2022 to reach more than \$400bn by the end of the decade.
- 18 Analysts said companies such as GRST could benefit from alarm in western capitals about China’s dominance in the EV supply chain. More than three-quarters of the world’s lithium-ion batteries come from China, primarily made by CATL and BYD.
- 19 “Europe in particular is heavily dependent on China. There is a strong push to become more self-sufficient by building a circular supply chain, going from relying on raw materials dug up from the ground to reusing spent batteries,” said Montgomery. “There is a tide of regulation coming in that will incentivise the recycling industry to develop.”

FT

Eleanor Olcott and Gloria Li, 11 November, 2023
© The Financial Times.
All rights reserved.
Articles republished from the *Financial Times*.

4 Understanding the article

a. Answer the questions about the article.

1. What is the average lifespan of a lithium-ion battery?
2. At what temperature are lithium-ion batteries heated for recycling?
3. What is hard to separate in a lithium-ion battery?
4. What could be the future, according to an expert on battery recycling?
5. What metals can usually be recovered from lithium-ion batteries?
6. What does GRST want to do in the next two years?
7. What problem has GRST overcome?
8. What is the recycling rate for lithium-ion batteries in the US?
9. What is the “battery passport”?
10. Who dominates lithium-ion battery production?
11. According to Sarah Montgomery, what will happen in Europe?

5 Business language – describing trends

a. Choose the correct option to replace each word in bold.

1. Investors expect **a surge** in disposed battery packs.
a. decrease b. growth
2. Global investment in battery-related start-ups **reached** \$9.2 billion by September.
a. amounted to b. was just under
3. According to Crunchbase data, investment is set to **exceed** the preceding two years.
a. equal b. grow more than
4. There has been a broader **downturn** in tech investment.
a. dip b. rise
5. Battery-related start-ups collectively **raised** \$7.8bn in 2022, down from \$12bn in 2021.
a. fell to b. obtained (investments)

6. Demand for batteries **is rising** in line with increasing use of electric vehicles.
 - a. is increasing
 - b. is remaining steady
7. McKinsey analysts **forecast** that the value of the entire lithium-ion battery supply chain will increase by 30 per cent annually.
 - a. anticipate
 - b. find it unlikely that

b. The graph shows the share prices of a car technology company. Complete the sentences about the graph using the words below. You may need to change the form of the words.



dip exceed forecast growth rise surge

1. There was a _____ in share prices in May.
2. In mid-May, stock prices _____ \$900.
3. There was a sudden _____ in share prices in August.
4. Share prices _____ steadily at the end of the year.
5. Based on historical data, investors _____ further _____ for the following year.

Intermediate

6 Discuss these questions

- What could your country do to increase the EV adoption rate?
- Should governments subsidise research and development for battery and battery-disposal technology? Or what should they invest in for a more sustainable future?
- Do you think it is more critical to make cars greener or to expand public transportation options where you live? How could this be done?

7 Wider business theme – creating a pitch deck

1. Choose one of the situations and complete the tasks below.

Situation 1

After completing an environmental impact evaluation, your company has decided to develop a new eco-friendlier version of one of its products. This challenge is open to all areas of the company. You are going to pitch your idea to management.

Situation 2

You are an entrepreneur who sells an eco-friendly product. You are going to pitch your idea to a potential investor.

Task 1 – Product ideation

Think of a new product or a new version of an existing product. How can you make it more environmentally friendly? Consider the points below and look at the helpful language to help you.

- reducing toxic chemicals or materials in the manufacturing process
- increasing recyclable materials used
- reducing pollution or waste produced
- improving the recycling rate

Useful language

biodegradable

compostable

eco-friendly

energy-efficient

ethical investment

microplastics

recyclable

regeneration

sustainable design

Task 2 – creating your pitch deck

Create a concise presentation to share your business idea with others. Include the following slides:

1. Title
2. Introduction (who you are and why you're here)
3. Problems (2–3 problems the product aims to tackle)
4. Solution (keep it clear and concise)
5. Market size, trends, opportunities (provide numbers)
6. Product comparison (say who your competition is and why you're different)
7. Financial projections (What are your goals?)
8. Sales and marketing strategy (How will you reach your goals?)
9. Call to action (tell them what you need from them and remind them why)

Task 3 – the pitch

Practise and present your pitch.

Useful phrases:

My name is (name). I'm the (role) for (company).

We are developing (what) to help (who exactly) (do what) with (your unique offer).

We compete in the (what) market, with a growing value of (number).

Our customers/users are (who exactly).

While we are similar to (competition), we (your unique offer).

Unlike (competition), who (weakness/disadvantage), we (your solution).

At the moment, we (describe where your team/product/company are at).

We are looking for (what you need) to (what you expect to achieve).