



# Li-ion battery recycling

*Corporate presentation - June 2022*

*Non-confidential*



# VEOLIA ENVIRONNEMENT, COMPANY OVERVIEW

## Solutions for water, waste and energy management

220,000 employees

€38 billions turnover

5 continents

*Contribute to human progress by firmly committing to the Sustainable Development Goals set by the UN to achieve a better and more sustainable future for all*



### Water

98\* million people supplied with drinking water  
67\* million people connected to wastewater service

### Waste

50\* million metric tons of waste treated  
42\* millions people provided with collection on behalf of local authorities

### Energy

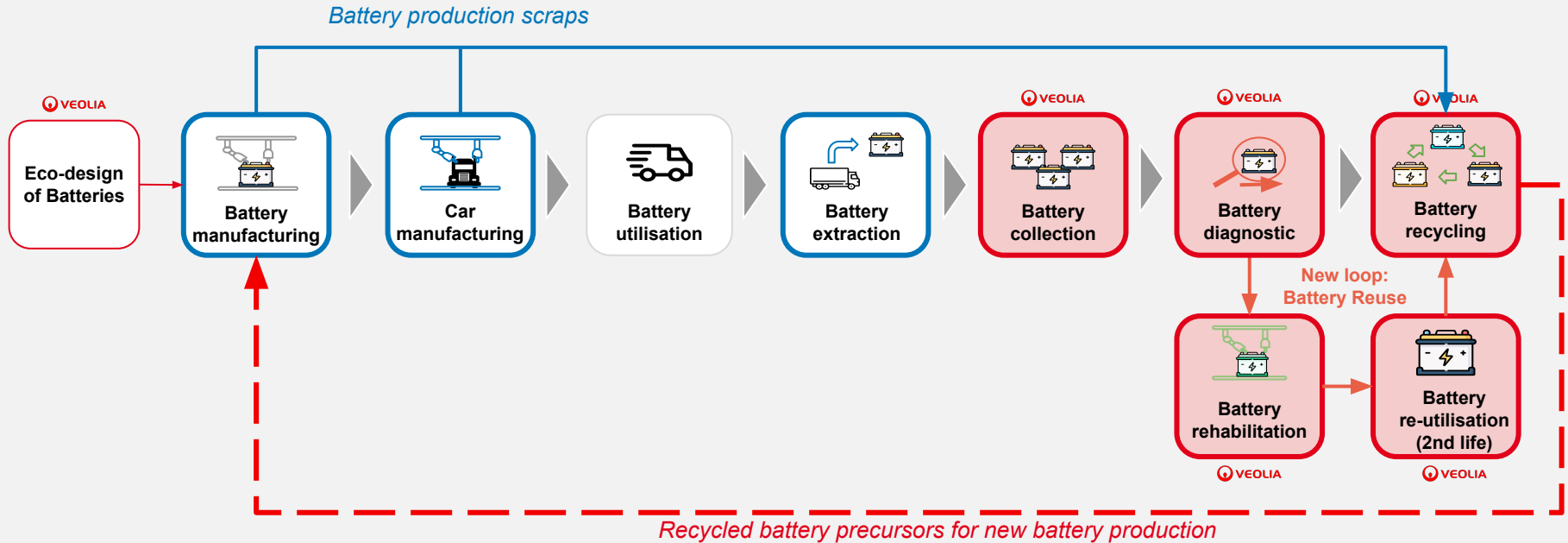
41\* million megawatt hours of energy produced  
45,000\* thermal installations managed



*\*old VEOLIA perimeter only*

# DEVELOP A NEW CIRCULAR ECONOMY

Matching our partners needs along the value chain



Close the loop in our partners supply chain, in compliance with future regulation and to develop safe and local raw materials supply

# FOCUS OUR SERVICES ON 3 MARKETS

## Veolia actively working to solve 3 burning issues

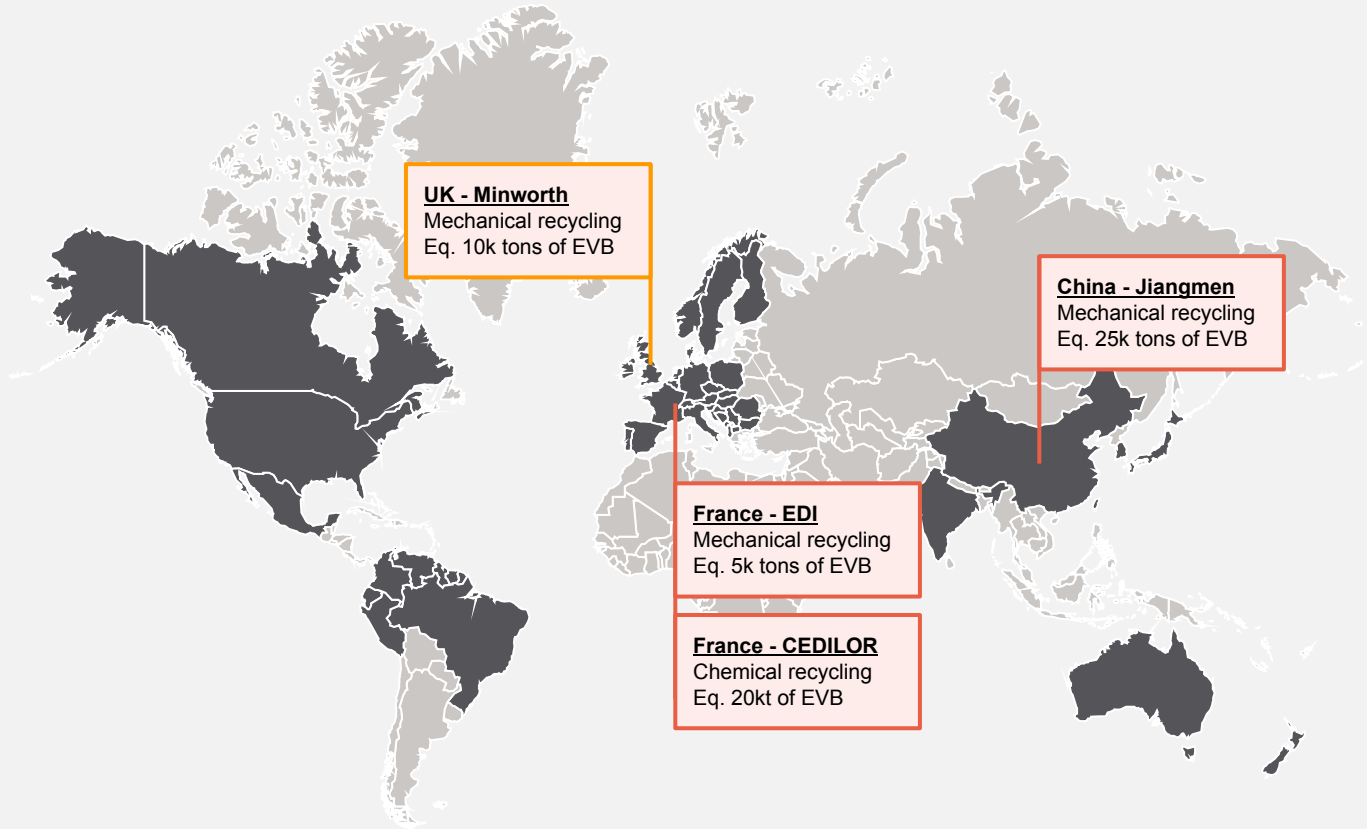
	DESCRIPTION	SPECIFICITIES	OPERATIONS
#1 Recycling	<p>Veolia is able to collect and recycle almost all Li-Ion battery technologies thanks to its internal recycling process (mechanical + hydrometallurgy)</p>	<ul style="list-style-type: none"><li>• Circular economical solutions on the whole value chain, tailored to our <b>clients requirements</b></li><li>• Ongoing R&amp;D projects, inhouse and with partners, for <b>continuous process improvement</b> and to comply with evolving regulation</li><li>• High process robustness &amp; <b>large tolerance to variability</b> of Veolia process</li></ul>	<ul style="list-style-type: none"><li>• Actual capacity of 30,000t/year</li><li>• Plants in Europe &amp; China (coming soon in USA)</li><li>• Scraps &amp; EoL batteries</li></ul>
#2 2nd life	<p>Veolia is launching experiments in 3 areas:</p> <ul style="list-style-type: none"><li>- Electrical Network flexibility</li><li>- Storage for renewable integration</li><li>- Fast EV charging stations</li></ul>	<ul style="list-style-type: none"><li>• Veolia is an expert of all the value chain of hazardous waste, thus supplying <b>turnkey solutions and avoiding intermediaries</b></li><li>• <b>Recycling costs</b> are <b>eliminated</b>, at best some revenue can be generated</li><li>• The <b>environmental footprint</b> of the battery is <b>reduced</b></li></ul>	<ul style="list-style-type: none"><li>• POCs under construction with partners in France &amp; UK</li><li>• Veolia won't work on battery remanufacturing (sub-contractors identified)</li></ul>
#3 Eco design	<p>Veolia is working with its ecosystem on the eco-design of EV batteries to facilitate its dismantling at the end of its life cycle.</p>	<ul style="list-style-type: none"><li>• Recycling made <b>easier and therefore cheaper</b></li><li>• More materials will be <b>recovered</b></li><li>• Materials <b>payback to partners will increase</b></li></ul>	<ul style="list-style-type: none"><li>• Veolia involve in the ecosystem and on specific R&amp;D projects with OEM's</li><li>• Environmental services to reduce footprint (waste / water) from battery production</li></ul>



# VEOLIA'S EVB RECYCLING FOOTPRINT

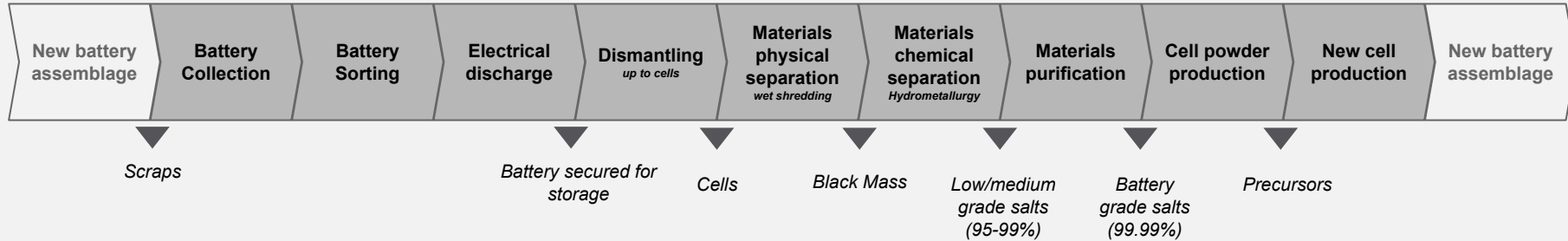
3+1 plants dedicated to EVB, many ongoing projects

## Existing partnerships:



# #1 CLOSE THE LOOP OF RECYCLING

## Battery to battery production with VEOLIA unique know-how



Production: plastics, steel, electronics, aluminium, copper, NMP + salts of Ni, Co & Li

### Inhouse

2 plants in France

1 plant in China

1 plant in UK (construction)

Projects (North America, Asia & Europe)

### Partners

additional purification process

# ADAPT LOGISTIC TO CUSTOMERS

## 3 types of recycling unit available to massify volumes

### *Dismantling units - Local*

*On-site & Off-site*

Battery  
discharging &  
disassembly

**In:** Full battery

**Out:** Battery cells or  
modules



EV

→  
*Casing and electrical wires*  
**Battery cells**



Battery

### *Mechanical units - Regional*

*On-site & Off-site*

Mechanical  
separation of  
materials

**In:** Battery cells

**Out:** Black Mass



→  
*Copper, Aluminium, Plastics*  
**Black Mass (mix of Ni, Li & Co)**



Black Mass

### *Hydrometallurgy - Continental*

*Off-site*

Chemical  
separation of  
materials

**In:** Black Mass

**Out:** Battery grade  
salts



→  
*Purified salts of Ni, Li & Co*  
**(from low to battery grade)**



Metals/Salts

# SAFETY IS OUR NUMBER ONE PRIORITY

Our employees are our most valuable resource

Veolia's "Always Safe" safety policy, aims at **improving the safety** of each employee at their workstation and guaranteeing a work environment promoting health preservation.

Veolia deploys a **health and safety system for comprehensive and efficient management**, and relies on audit programs and corrective measures:

- Objective of **reducing the accident frequency rate by 10% per year** and results included in the variable portions of managers' pay.
- Safety management leveraging **qualitative objectives** based on the **10 Group standards**
- Health & safety audit** program led by corporate and operational entities



alwa✓safe



Ressourcer le monde  **VEOLIA**