

GLENCORE

# Glencore Recycling – growing our platform

## **September 2023**



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## The “Urban Mine” is great to talk about, but very hard to “mine”

What people think it is ...





## The “Urban Mine” is great to talk about, but very hard to “mine”

What people think it is ...



What it really is



## **No one player can scale and lead across the breadth of the value chain**

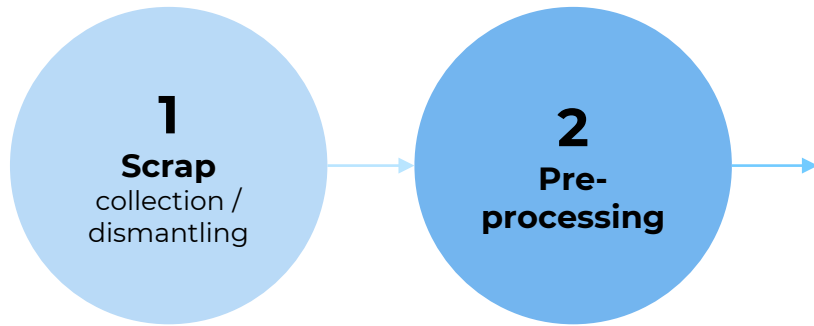
## No one player can scale and lead across the breadth of the value chain



### Not Glencore's focus

Will rely on partnerships (several already inked for EVs and end of life battery recycling)

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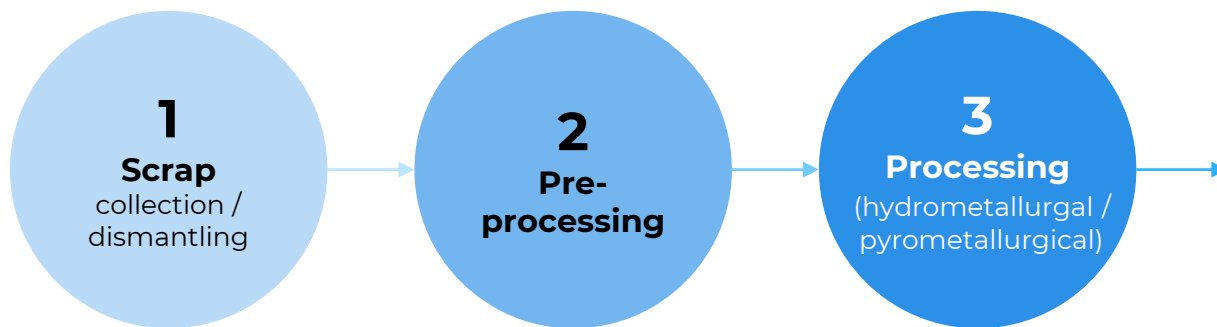
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### **Understand well but agnostic as to who does this**

Can deploy own capacity if it has a strategic value (e.g. co-locate spoke with an OEM; develop one at existing site, etc)

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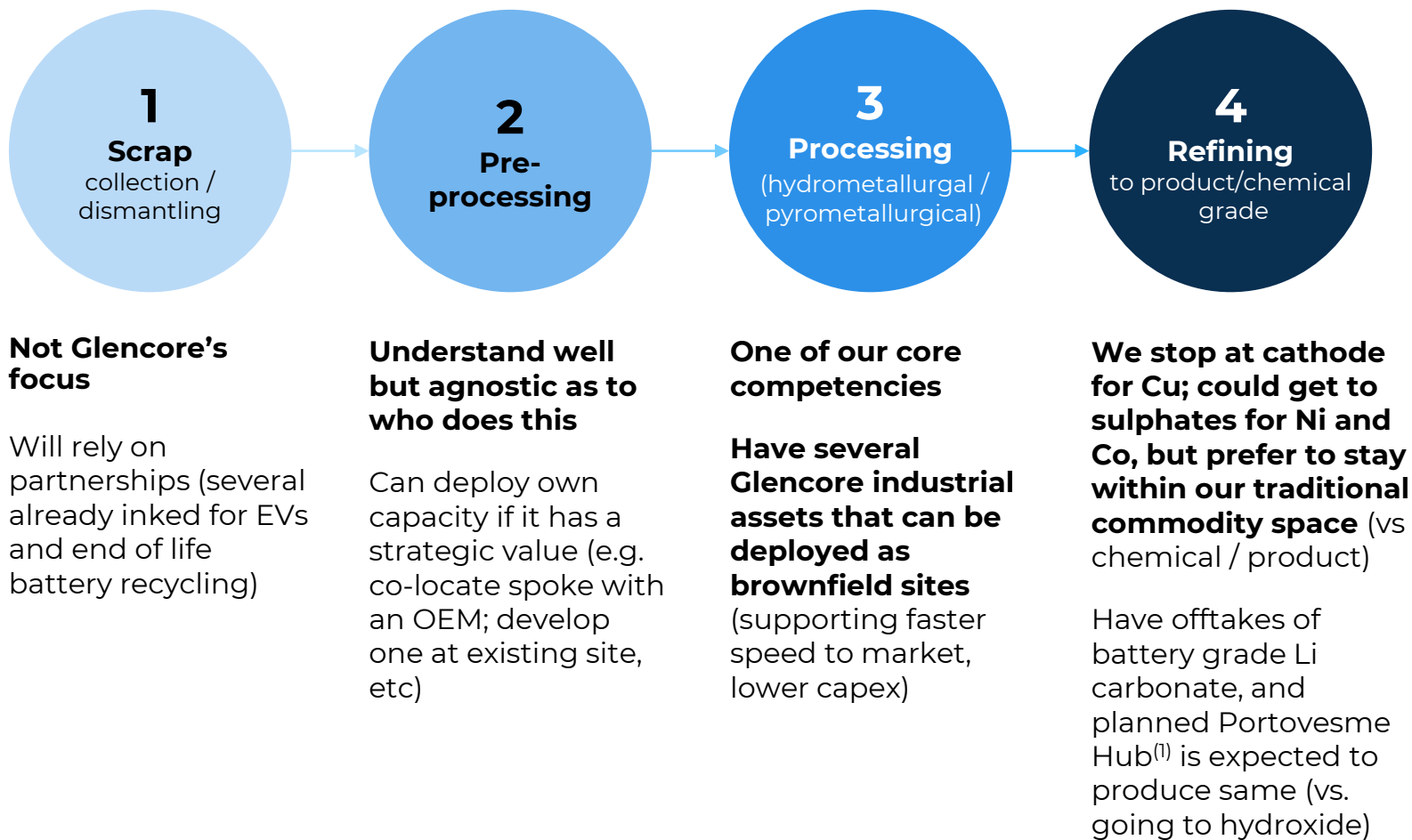
Can deploy own capacity if it has a strategic value (e.g. co-locate spoke with an OEM; develop one at existing site, etc)

### **One of our core competencies**

**Have several Glencore industrial assets that can be deployed as brownfield sites** (supporting faster speed to market, lower capex)



## No one player can scale and lead across the breadth of the value chain



Notes: (1) Refer to slide 13 for more information

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# We need a paradigm shift to accelerate the circular economy

Where we are	Where we need to be	What is Glencore doing?
Linear thinking creates mismatched ambitions	Circularity aligns goals: Big Tech → OEMs → Consumers → Recyclers → Smelters	Helped define and launch the Circular Electronics Partnership <sup>(1)</sup> . Taking leadership on furthering battery circularity in North America and Europe
Regulatory frameworks focused on deterring movement of waste	Facilitate trans border movement of waste for sustainable recycling and recovery of metals	Working with international organisations and policy makers to raise awareness and find solutions that accelerate circularity without diluting oversight & compliance
Post consumer waste keeps increasing	Increase capacity for responsible and sustainable recycling	Seeking to increase capacity worldwide – in core as well as new markets, across key streams such as batteries, end of life electronics and ASR <sup>(2)</sup>
“Waste”	“Post Consumer Resources”	Deploying technology to recover products/metals from a wide spectrum of difficult to process post consumer materials

Notes: (1) Circular Electronics Partnership: <http://www.cep2030.org/>. (2) Automotive Shredder Residue

## Our core competencies support delivery of our ambition

### Multi-commodity metallurgical footprint

- Capable Cu, Zn, Pb and Ni smelting and refining assets able to handle a wide range of inputs, metallurgy and impurities
- Primary mined as well as recyclable feeds
- Assets are able to treat each other's by-products & waste streams
- High by-product recovery

- Glencore is well positioned to treat polymetallic scrap from the “urban” mine
- Ability to provide innovative solutions to old and new manufacturing industries for their scrap
- Aim to achieve maximum value recovery with minimum waste

### Processing capabilities

- Ability to recover what others may not be able to, leveraging our polymetallic footprint to utilise most commodities within input scrap feeds

- Use of metallic Zn in Zorba scrap as a reductant for lead and replacement for coke
- Use of graphite from black mass refining as a reductant fuel
- Potential recovery of Zn from automotive shredder residue (ASR) via Cu smelting
- Use of carbon/organics as a fuel/reductant

### Commercial resources

- We have the people, processes and tools dedicated to handling the volume, contract and transaction complexities of the recycling business

- We manage manufacturing and end of life scrap from the electronics and (ICE) auto sectors and are well positioned for emerging markets such as EVs, large format batteries, Gigafactory scrap and solar panels
- Support the development of European e-waste legislation and stand ready to participate in similar processes for new types of scrap and waste

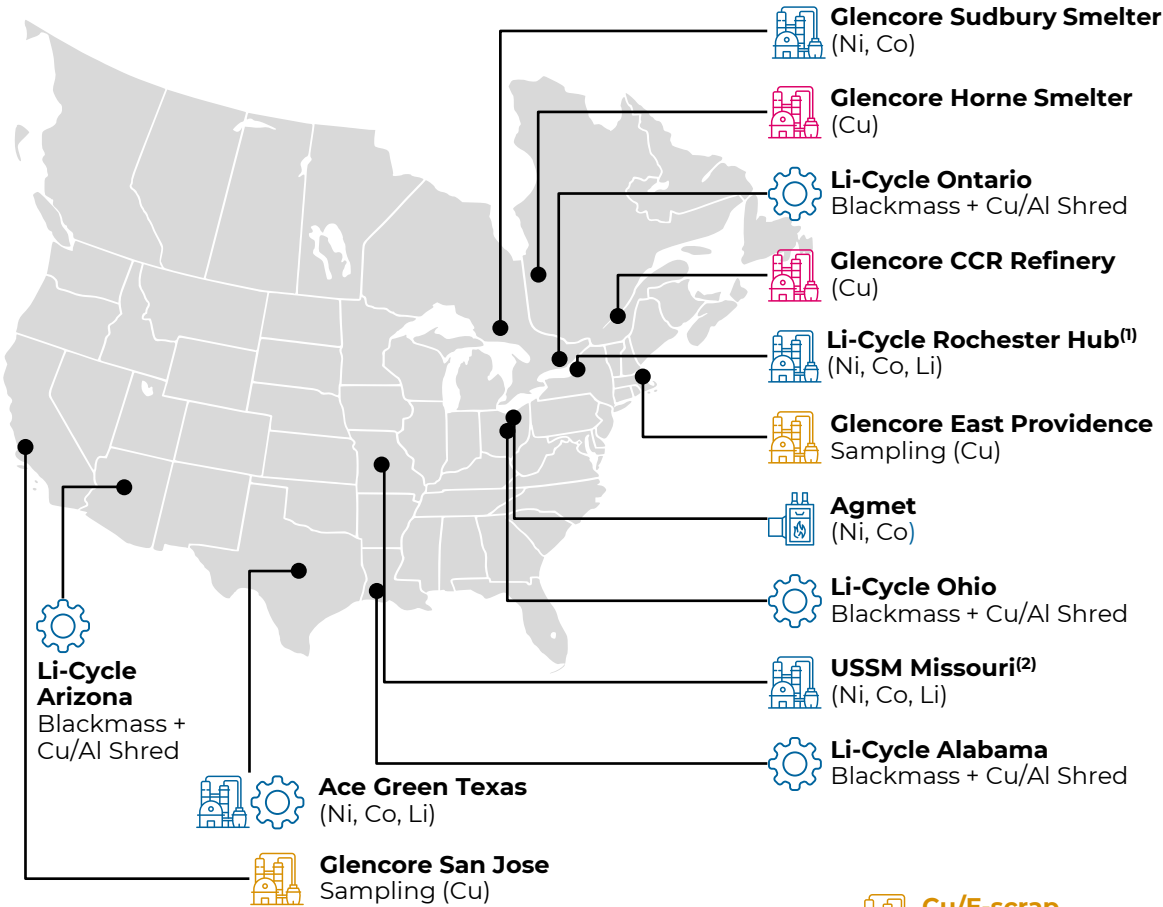


# Expanding our North American pre-processing and downstream refining footprint

Shredding facilities

Calciner

Refining / Smelting



Notes: (1) Expected to start commissioning end-2023. (2) Expected to start commissioning in 2024.

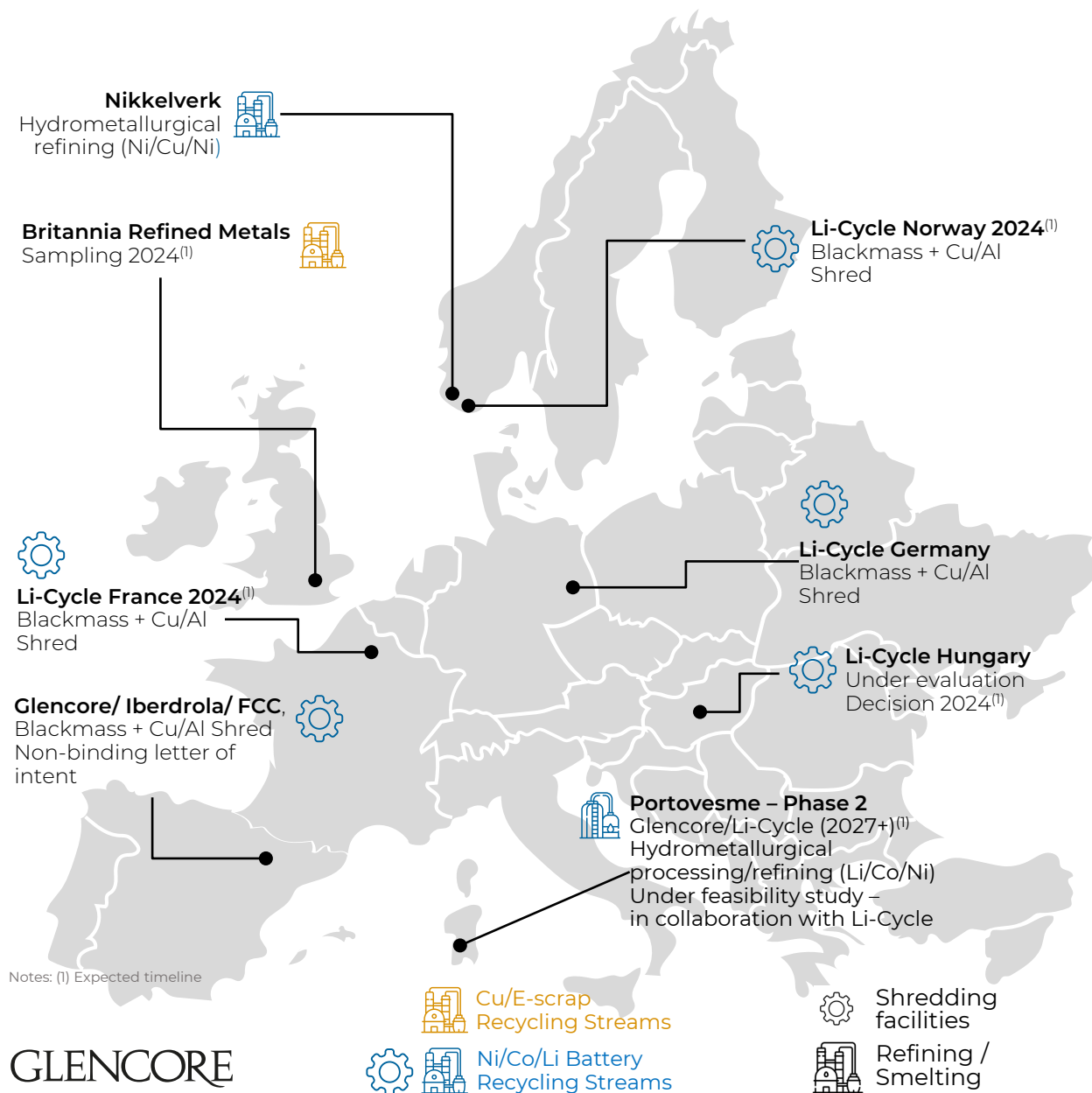
**Cu/E-scrap**  
Recycling Streams

**Ni/Co/Li Battery**  
Recycling Streams

**Both Streams**

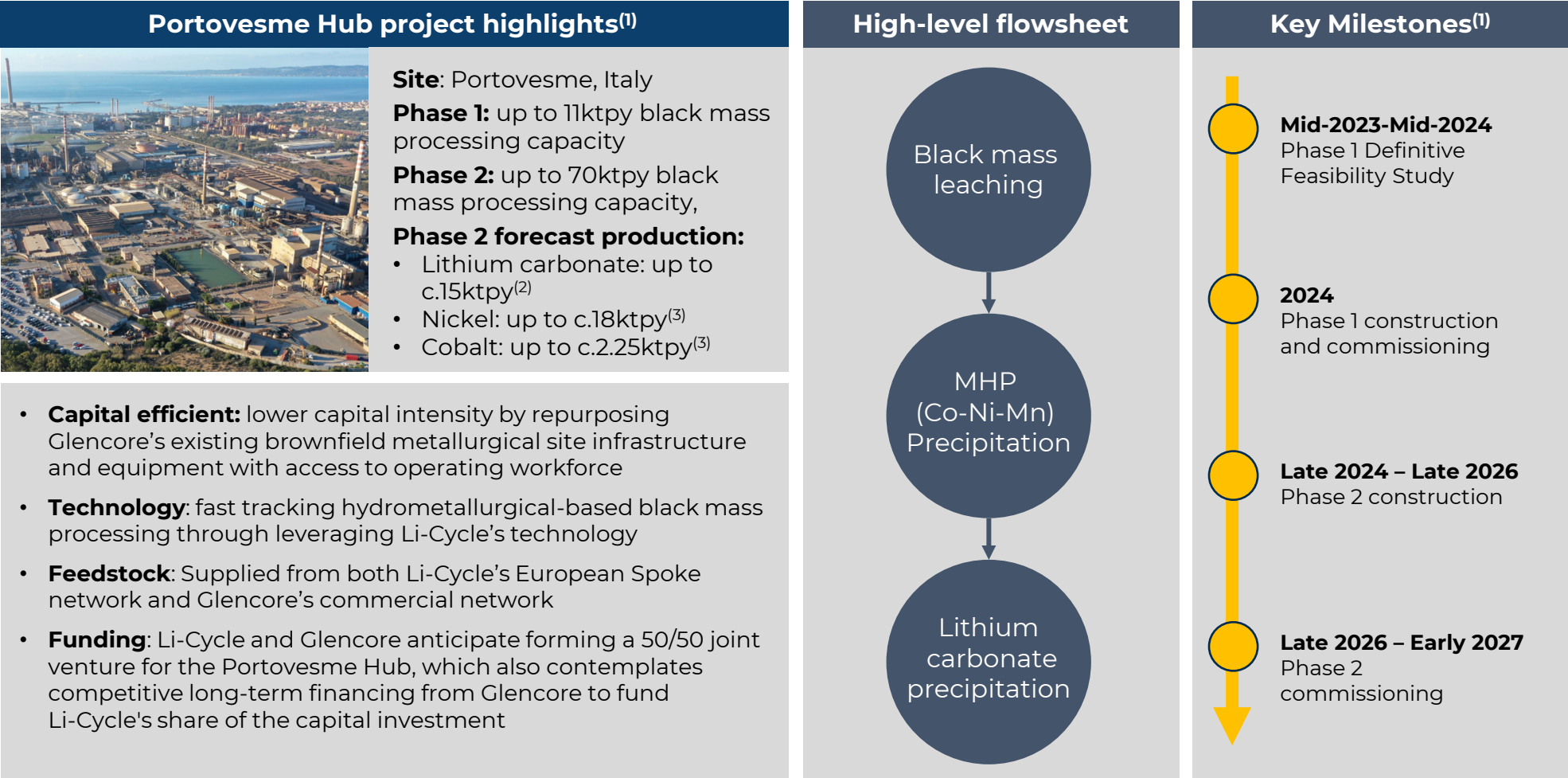
- Solutions for battery materials recycling from scrap at all stages of lifecycle (from manufacturing scrap to post consumer scrap) and batteries (recall / end-of-life)
- Diversified portfolio of flowsheets (3 hydromet & 1 pyromet)
- Strong North American footprint, including transport and storage solutions, quality management, as well as the ability to hedge battery metals price exposure

## Expanding our European recycling downstream footprint



- Solutions for battery materials recycling from scrap at all stages of lifecycle (manufacturing to post consumer) and batteries (recall / end-of-life)
- Enabling minimum recycled content and security of supply – achieved by combining primary and recycled battery metal streams to produce precursor
- Lower carbon footprint with optimised/minimised transport and downstream refining within Europe
- Strong European footprint, incl. transport & storage solutions, quality management, as well as the ability to hedge battery metals price exposure

# Collaborating to accelerate black mass processing in Europe



Notes: (1) Portovesme Hub is expected to commence construction upon completing Definitive Feasibility Study and subject to final investment decision and regulatory approval. (2) Projected to produce 15ktpy to 16.5ktpy of lithium carbonate. (3) contained metal.

Portfolio of own and partner assets offers enhanced geographical coverage and strategic flexibility, while bringing value to customers

	Asset	Advantages
Li-Cycle	Rochester	<ul style="list-style-type: none"><li>Atmospheric acid leach for MHP, and third party recycled black mass</li><li>Planned LFP recovery process</li><li>Associated Spoke system enables direct sourcing of battery material</li></ul>
	Portovesme	<ul style="list-style-type: none"><li>Repurposing brownfield asset</li><li>Provides MHP<sup>(1)</sup> that can be sent to Glencore owned as well as third party refining/pCAM<sup>(2)</sup></li><li>Associated Spoke system with Li-Cycle enables direct sourcing of battery materials</li></ul>
GLEN & Li-Cycle		
GLEN	Sudbury INO	<ul style="list-style-type: none"><li>Flexible converter</li><li>Ability to handle a wide range of impurities</li><li>Existing capacity</li></ul>
	Horne Smelter	<ul style="list-style-type: none"><li>Substantial copper recycling capacity</li><li>Ability to handle Cu based shred from battery recycling</li></ul>
Other	US Strategic Metals	<ul style="list-style-type: none"><li>Pressurised oxidation leach-that can accept a wide range of primary materials</li><li>Ability to process black mass as portion of feed</li></ul>
	Agmet	<ul style="list-style-type: none"><li>Calcining capacity that allows handling of a diverse range of feedstocks for onward processing at Sudbury INO</li></ul>

Glencore and our partners, together, provide a combination of value, flexibility, and circularity for our customers and OEM partners

Notes: (1) MHP refers to mixed hydroxide precipitate. (2) pCAM refers to precursor cathode active material



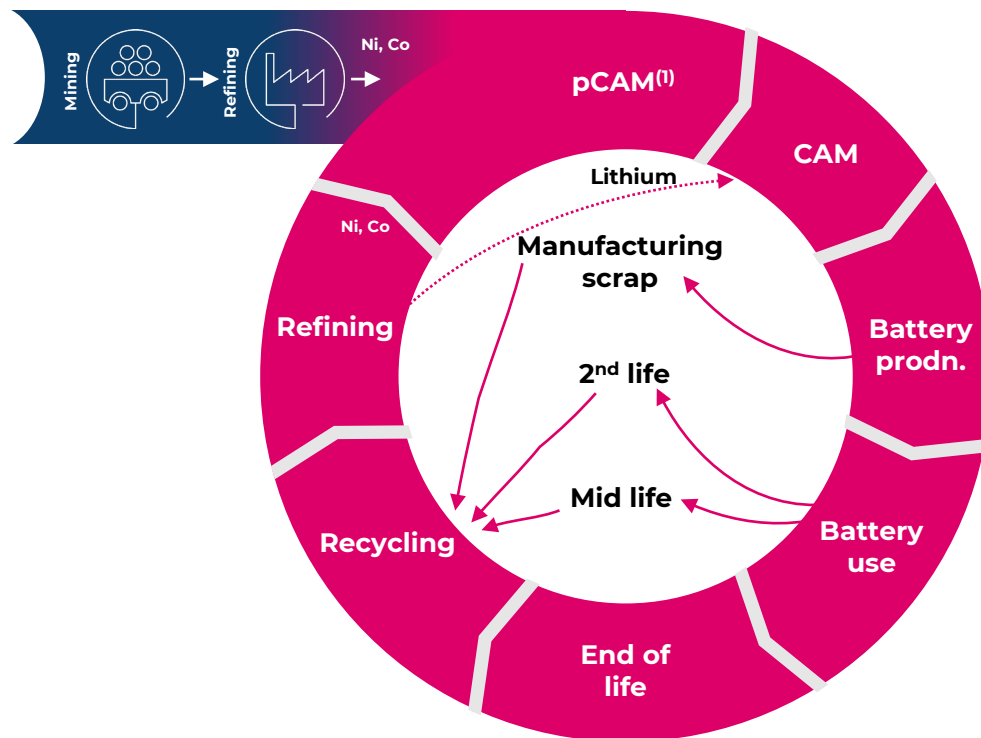
## Investments and partnerships underpin our growing scale in production and marketing of recycled battery metals (Ni, Co, Li)

### We are working on closing recycling loops through:

- combining primary and recycled battery metals to produce battery metals at scale;
- including as much recycled content as feasible;
- localising in key regions of the world, starting with Europe and North America

### Partnerships

- Numerous partnerships signed to date across the downstream battery materials value chain



We are exploring partnerships for upgrading Lithium carbonate to battery grade carbonate / hydroxide for further supply to CAM<sup>(2)</sup> plants

Notes: (1) pCAM refers to precursor cathode active material. (2) CAM refers to cathode active material

## Driving circularity in electronics – Circular Electronics Partnership



- In 2020, we shaped the foundation of a new partnership through a vision and roadmap with 80+ contributors, 30+ companies and 7 organisations
- The partnership aims to reimagine the value of electrical products and materials using a lifecycle approach, reducing waste from the design stage through to product use and recycling

### What are we trying to solve?<sup>(1)</sup>

- Today we are producing more than **50 million tonnes of e-waste annually**
- An estimated **80% is not collected** for recycling with 4% thrown into household waste
- It is estimated **there are 100 million plus old devices in homes**
- At the current rate **we will produce 120 million tonnes of e-waste annually by 2050**

Notes: (1) Source: [www.cep2030.org](http://www.cep2030.org)

# In 2022, we piloted issuing “Recycled Metal Certificates”

We are testing whether the “recycled” attribute can be disassociated from the metal, allowing for the free movement of metal while creating a premium for recycling, thereby incentivising recycling capacity build out, in a practical and speedy manner



**OEM expectations**

- 100% recycled metal
- Zero carbon footprint
- Full traceability and transparency
- Silent on premium

**Reality**

- Hybrid recycling is most practical
- Recycling at scale has costs that the industry needs to support
- Upstream value chain not fully committed

**Customer experience:**

**Customer 1**

- 11.2kt Cu equivalent certificate
- Piloting for several initiatives: zero waste to landfill, supply chain transparency, circular economy, responsible sourcing and carbon reduction targets

**Customer 2**

- 11kt Cu equivalent certificate
- Piloting to test customer willingness to accept a premium on eco-labelled products with lower carbon content in production of motors



## Like all commodity trading, recycling is not without risk



### **We manage recycling business risks through promotion of:**

- Diligent financing of trade flows, and working capital management
- End to end logistics, with related efficiencies and savings
- Commodity price risk management, either via hedging instruments or physical management
- Optimisation of end to end business, seeking to allocate material and resources responsibly to achieve optimal returns
- Supply chain due diligence; of great importance in the recycling materials / scrap industry
- Quality control / sampling / assaying



# How it all fits together

