How ESG shapes sustainable battery value chains

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Overview

- What is ESG?
- Sustainability benefits of batteries
- What are the ESG challenges for battery values chains?
- How are these being addressed
- Is ESG relevant to lead batteries?
  - LB360- A tool for demonstrating ESG performance in the lead battery value chain
- Acknowledgments

What is ESG?

ESG is a framework that helps stakeholders understand how an organization manages risks and opportunities around sustainability issues.

ESG has changed how capital allocation decisions are made by many of the largest financial services firms and asset managers in the world.

Sustainability benefits of batteries

- **Global demand for batteries is increasing,** driven largely by the imperative to reduce climate change through electrification of mobility and the broader energy transition.
- Batteries can **bring electricity to ~850 million** people through microgrids, solar home systems and solar lanterns

ESG Challenges for battery value chains

- McKinsey has identified 21 risks for battery value chains along ESG dimensions including:
- **Environmental:** The extraction and refining of raw materials, as well as cell production, can have severe environmental effects, such as land degradation, biodiversity loss, creation of hazardous waste, or contamination of water, soil, and air. Unprofessional or even illegal battery disposal can cause severe toxic pollution.
- **Social:** Unless strictly managed, operations across the battery value chain could have unfavorable effects on regional communities through violations of labor laws, child and forced labor, and indigenous rights, especially in emerging markets.
- **Governance:** Businesses in the battery value chain may encounter conflicts of interest or other companies with subpar management practices. To meet longstanding expectations for ethical businesses, companies must avoid financial situations involving corruption, bribery, funding armed conflicts, and tax evasion.

The battery value chain continues to face numerous environmental, social, and governance challenges.

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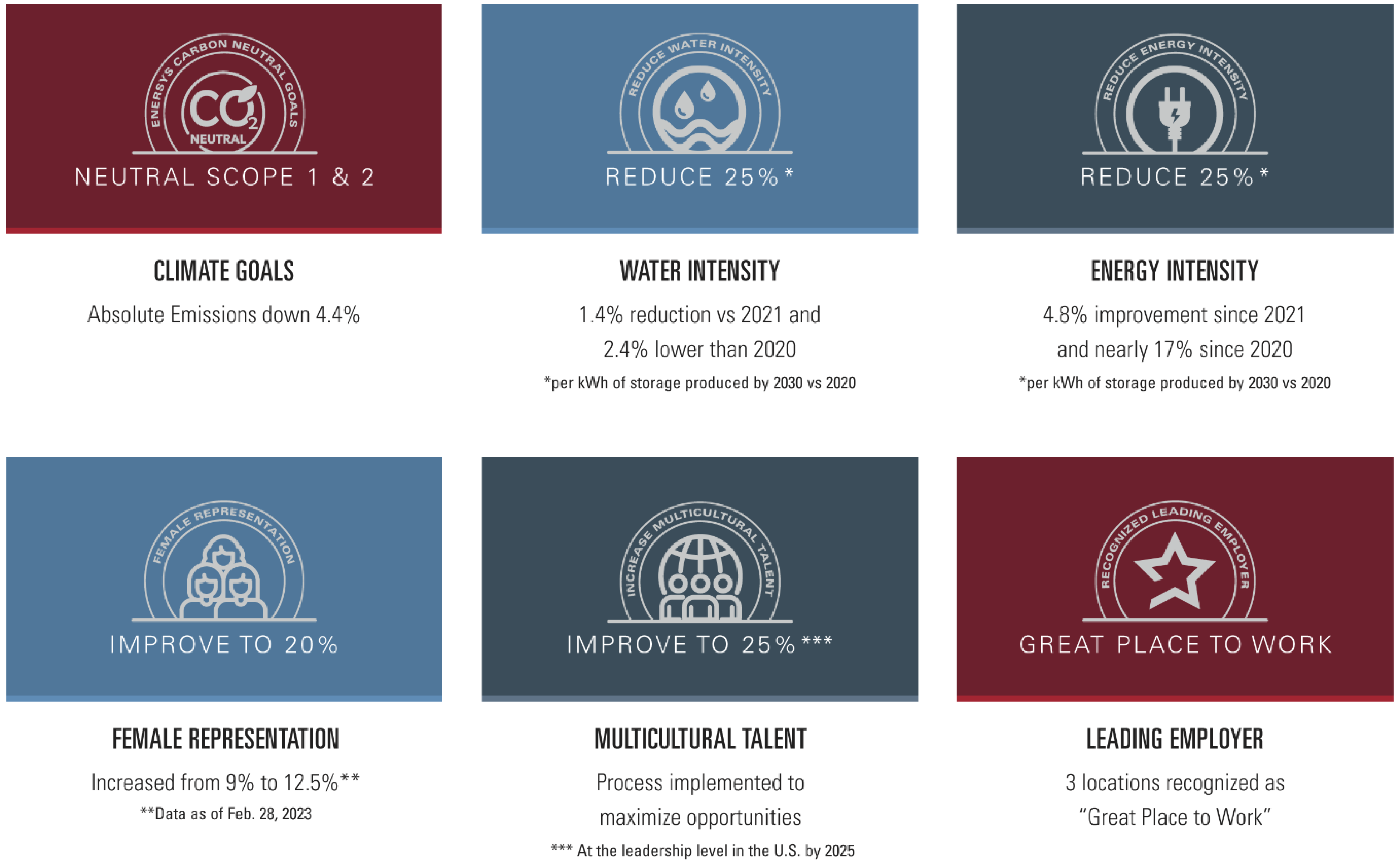
Addressing ESG concerns in battery value chains- Self Governance

Battery Company Self-Governance

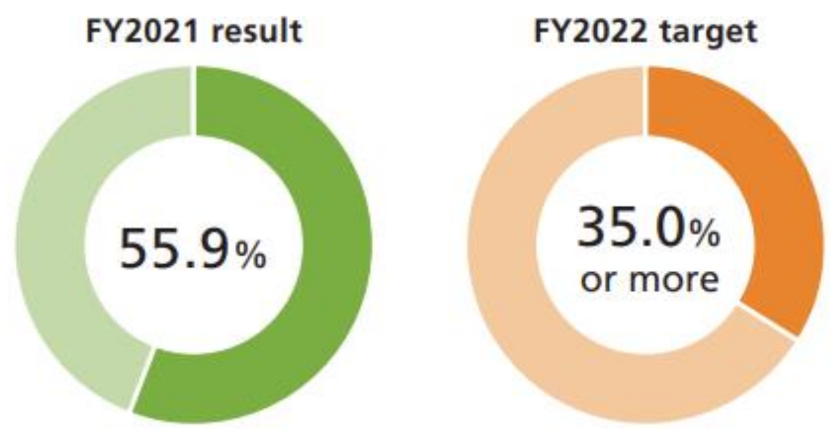
- *Materiality Assessments*
  - Climate change/carbon footprint
  - Environment, Health & Safety
  - Energy management
  - Water intensity
  - Materials sourcing
  - End of life management
  - Diversity & inclusion
  - Talent attraction
  - Human rights (working hours, child labour etc)
  - Fair competition and antitrust
  - Community engagement

Battery Company Target Setting & Reporting



Other companies have included specific targets related to product design

Ratio of recycled lead used as lead raw material in lead-acid batteries



Addressing ESG concerns in battery value chains- Self Governance

Sectoral ESG programmes of relevance to battery value chains

- Global Battery Alliance Principles and Battery Passport
- Cobalt Action Partnership (CAP)
- RMI Cobalt Refiner Due Diligence Standard
- Copper/Nickel/Zinc/Moly Mark
- London Metals Exchange passport

All focus on Lithium-Ion supply chains…….but equally relevant to lead batteries

The GBA Guiding Principles

All members commit to a set of Guiding Principles established as the necessary conditions for a sustainable and responsible battery value chain:

Establish a circular battery value chain as a major driver to achieve the Paris Agreement

1. Maximizing the productivity of batteries in their first life
2. Enabling a productive and safe second life use
3. Ensuring the circular recovery of battery materials

Establish a low carbon economy in the value chain, create new jobs and additional economic value

4. Disclosing and progressively decreasing greenhouse gas emissions
5. Prioritizing energy efficiency measures and substantially increase the use of renewable energy as a source of power and heat when available
6. Fostering battery-enabled renewable energy integration and access with a focus on developing countries
7. Supporting high quality job creation and skills development

Safeguard human rights and economic development consistent with the UN Sustainable Development Goals

8. Immediately and urgently eliminating child and forced labour, strengthening communities and respecting the human rights of those employed by the value chain
9. Fostering protection of public health and the environment, minimizing and remediating the impact from pollution in the value chain
10. Supporting responsible trade and anti corruption practices, local value creation and economic diversification

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Addressing ESG concerns in battery value chains- Regulation

EU Battery Regulation Materiality

First global regulation to establish full lifecycle approach from mining to EoL and ensures that batteries placed on EU market consider global ESG issues

- Product safety
- Producer responsibility
- Electrochemical performance/efficiency
- Climate change impacts/carbon footprint
- Hazardous material risk
- Responsible sourcing and ESG risks of supply chain [but restricted to Li, Co, Ni, graphite)
- Recycled content
- Collection and recycling rates
- Equivalent conditions for treatment of exported battery waste

- Supported by **new EU corporate sustainability due diligence Regulation and sustainability reporting standards** that establish new ESG requirements

EU Battery Regulation Targets

- Maximum life cycle carbon footprint thresholds
- Minimum use of recovered materials in battery manufacturing
- Minimum recycling efficiencies and material recovery target for Pb, Co, Ni, Li, Cu
- Collection targets (waste portable and LMT only)

Is ESG relevant to lead-battery value chains?

- Although external focus has undoubtably been on sustainability of Li-ion, if lead chemistry is to be part of the future global battery mix, then will need to be included in company ESG reporting
- Many battery manufacturers (Clarios, Enersys, GS Yuasa…) have recently undertaken ESG materiality assessments, established targets and now report publicly
- However, employee blood lead data is the only is target for which sectoral value chain targets have been established
- Appears to be gap in **sectoral response** to communicating and responding to ESG issues related to lead battery value chains that can undermine positive sustainability profile that can be associated with the product

The battery value chain continues to face numerous environmental, social, and governance challenges.

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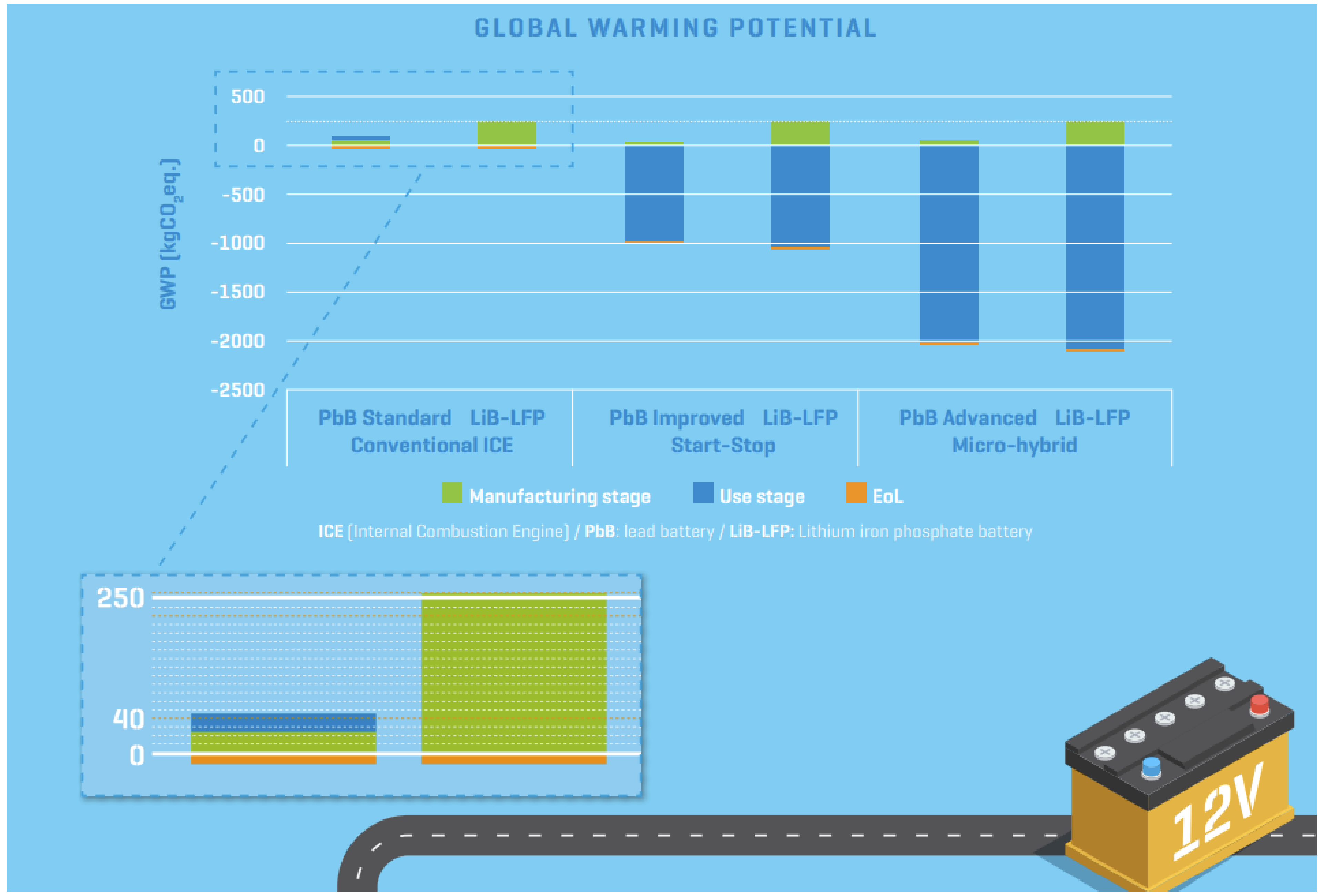
Lead Batteries Sustainability Profile - a reminder

- Lead batteries possess many sustainability attributes that are often forgotten due to pollution concerns that have damaged reputation:
  - Currently best example of a battery delivering a circular economy
    - High collection rates (~100%)
    - Highly efficient recycling process delivering battery grade raw materials
    - Strategic autonomy for raw material supply not impacted by geopolitical issues
    - New batteries manufactured with high recycled content (>80%)
  - Due to local recycling, manufacturing has relatively low carbon footprint compared to alternatives (in EU, 12V Pb manufacturing 6X lower GWP cf LFP)
  - Sourcing of primary raw materials covered by LME standard
  - But poor recycling practices continue to dominate the narrative

90% of a lead battery is recycled at end of life[4]: and nearly all of the lead recovered is re-used in batteries[5] – creating a circular product cycle that minimises the generation of waste.

A new lead battery is made up of more than 80% recycled material.[6]

75% of lead in European lead batteries is now produced from recycled sources.[7]



ESG- Lead Battery 360°

- Lead battery 360° is more than Industries commitment to supporting improvements in lead battery recycling in low- and middle-income countries
- Also aims to providing a framework for a **verified company site ESG assessment**, and **sectoral** reporting
  - All ESG governance challenges identified for batteries are covered by the **Performance Expectations** linked to the **seven Guiding Principles** of Lead battery 360°
  - Also includes additional focus on management of lead exposures & emissions
  - The Associated **KPI's** developed would also allow for **collective reporting** of progress against commitments
- The question still to be answered is whether companies see benefits in implementing this sectoral assurance framework to **increase trust in stakeholders** that lead battery value chain ESG issues are being managed

1.B. Environment

(a) **Environmental Legal Compliance.** Maintain compliance with applicable standards, laws, regulations, and international conventions related to the environment.

(b) **Environmental Policy.** Document, communicate and regularly review an environmental policy designed for continuous improvement, endorsed by senior management, and supported through the provision of human and financial resources.

(c) **Environmental Risks and Impacts Assessment and Management.** Maintain procedures and processes to identify environmental risks and impacts and apply the *mitigation hierarchy* to *minimize* and manage material risks and impacts.

(d) **Air quality.** Measure and *minimize significant air emissions* into the atmosphere (including, at a minimum, lead, arsenic, sulfur dioxide, and particulate matter) from point source and fugitive/diffuse emissions, as necessary to manage negative impacts on air quality.

(e) **Water quality.** Measure and *minimize* substances of concern in water discharges to surface waters, groundwater, and seawater, including, at a minimum, lead contaminants, as necessary to manage negative impacts on the receiving waterbody, ecosystem, or human health.

(f) **Spills and Leakages.** Prevent and manage spills and leakages to avoid and remediate adverse impacts on air, water and/or soil.

(g) **Energy consumption.** Quantify energy consumption and identify technically practical measures for setting energy efficiency targets and implement a plan designed to achieve such targets.

(h) **Greenhouse Gas (GHG) emissions.** Quantify GHG emissions and identify technically practical measures for setting GHG emissions intensity reduction targets and implement a plan designed to achieve such targets.

(i) **Water consumption and availability.** Quantify water consumption and identify technical and practical measures for setting water intensity reduction targets and implement a plan designed to achieve such targets and *minimize* negative impacts on water availability.

(j) **Hazardous waste management.** *Minimize* and, where possible, avoid the generation of hazardous wastes; where this is not possible, manage and dispose of waste in a manner that *minimizes* negative impacts on human health and the environment through a waste management strategy in accordance with the waste mitigation hierarchy.

(k) **Recycling Efficiency.** Ensure that recycling processes reduce the production of waste by maximizing recycling efficiencies and the levels of recovered materials.

(l) **Biodiversity protection.** Respect legally protected areas in accordance with local laws, understand potential negative impacts on biodiversity, and apply the biodiversity mitigation hierarchy to avoid, and

PRINCIPLE 4: Minimize the environmental impact of our products by encouraging the development of programmes that ensure effective collection, transportation and environmentally sound recycling of used lead batteries.

(a) **Undertake Due Diligence of Available Recyclers.** Before marketing batteries, undertake appropriate due diligence of the country/region to ensure that there is sufficient capacity available in ULAB recyclers that meet the Company's expectations for EHS, as defined in the Company's policies for responsible supply chain management. If marketing via distributors and resellers, ensure that these have systems in place to assess the EHS practices of ULAB recyclers.

(b) **Producer Responsibility.** Adopt business practices in all regions of battery sales that encourage a high collection rate of end-of-life batteries from responsible supply chain operators.

(c) **Battery Recycling.** Ensure that end-of-life products are supplied to formal, licensed recyclers that meet applicable regulations, or the Basel Technical Guidelines for the Environmentally Sound Management of Waste Lead-acid Batteries, and adopt business practices aligned with, at a minimum, the entry level requirements of Lead Battery 360°. At no time shall the company intentionally direct used batteries to informal recyclers.

(d) **Transportation of Used Lead-Acid Batteries (ULABs).** Ensure operators engaged to ship or transport ULABs package them intact and in a manner that avoids damage to batteries and leakage of electrolyte (battery acid) during transport and handling. Where batteries are damaged, ensure operators ship or transport ULABs adopting appropriate control measures that avoid negative effects on human health and the environment.

(e) **Maximizing use of recycled materials for battery manufacturing.** Design new battery products with maximal use of recovered/recycled material in new battery manufacturing and has implemented this concept in new product design.

(f) **Reducing carbon footprint of battery manufacturing processes.** Measure the carbon footprint of batteries along their lifecycle and take steps to reduce the carbon footprint by implementing actions that result in improved energy and manufacturing efficiency.

PRINCIPLE 5: Adopt business practices that consider the communities impacted by our operations, respect the human and labour rights of our employees and work against corruption in all its forms.

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Acknowledgements

- This presentation is based upon the following reports
  - **A Vision for a Sustainable Battery Value Chain in 2030**, WEF Sept 2019 [https://www3.weforum.org/docs/WEF_A_Vision_for_a_Sustainable_Battery_Value_Chain_in_2030_Report.pdf]
  - **Battery 2030: Resilient, sustainable, and circular**, McKinsey January 2023 [https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/battery-2030-resilient-sustainable-and-circular]
  - **Does ESG really matter—and why?,** McKinsey August 2022 [https://www.mckinsey.com/capabilities/sustainability/our-insights/does-esg-really-matter-and-why]
  - **Accelerating toward net zero: The green business building opportunity**, McKinsey June 2022 [https://www.mckinsey.com/capabilities/sustainability/our-insights/accelerating-toward-net-zero-the-green-business-building-opportunity]
  - **Green Deal: EU agrees new law on more sustainable and circular batteries to support EU's energy transition and competitive industry**, EU Commission December 2022 [https://ec.europa.eu/commission/presscorner/detail/en/IP_22_7588]

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Thank You!