LITHIUM-ION BATTERY OVERPRODUCTION

DEFINITIONS, DRIVERS, AND STRATEGIES FOR IMPACT

AUGUST 2026

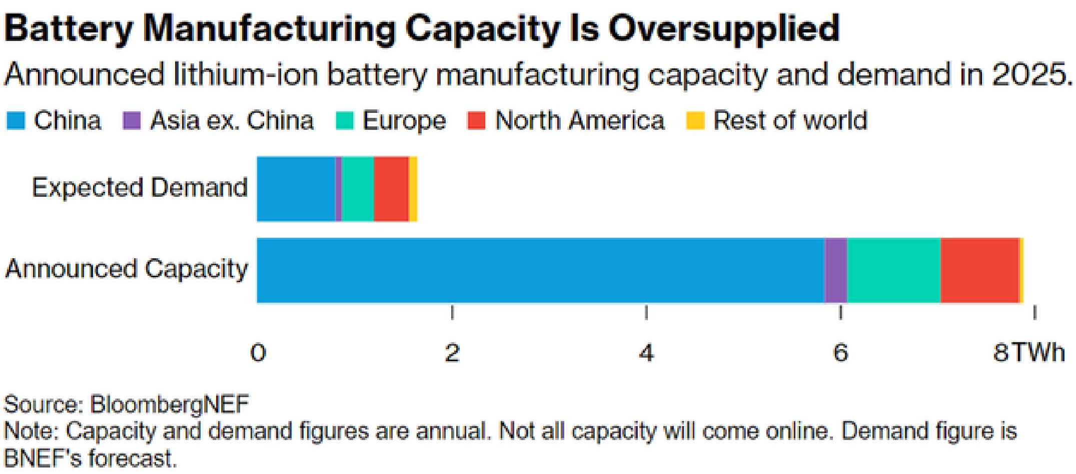
no-burn.org/batteries/#ev

On June 3, 2026, GAIA and SOMO convened a two-hour virtual learning circle on lithium-ion battery overproduction, bringing together more than twenty participants from industry analytics, research, civil society, labour organisations, affected community advocates, and philanthropic foundations. Participants joined from China, Argentina, Chile, the United States, and across Europe. This discussion paper synthesises the key themes, insights, and areas of convergence and tension that emerged across the session. [1]

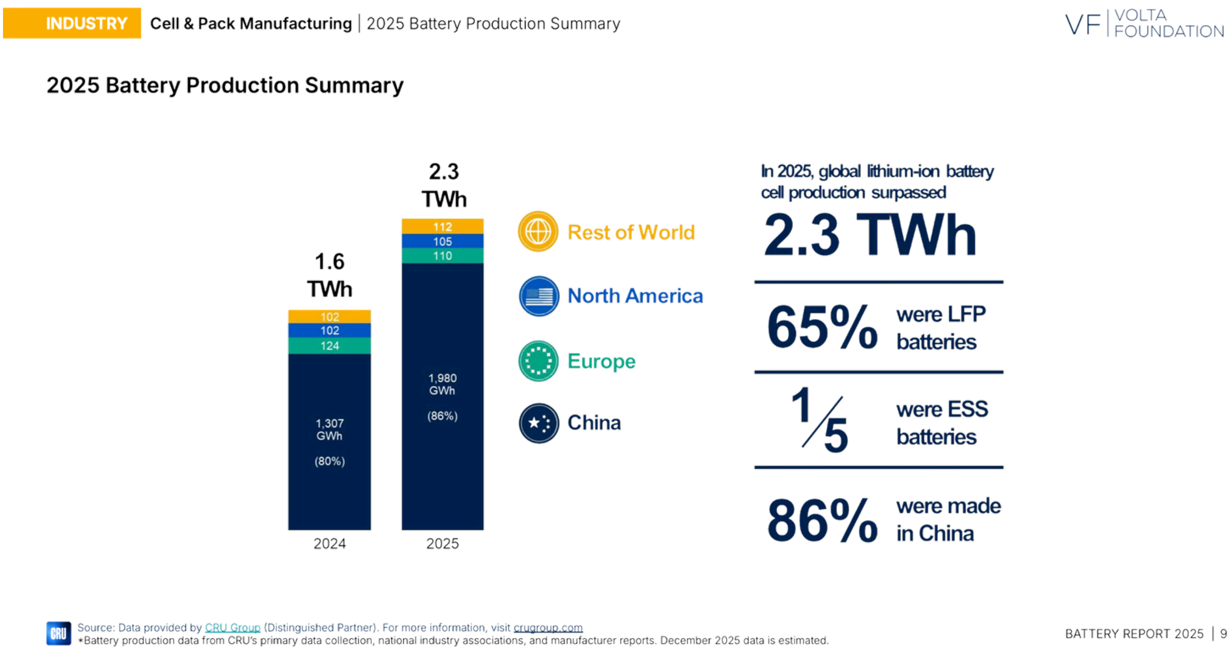
[1] This discussion paper synthesises key themes, insights and perspectives that emerged during the learning circle. The discussion was held under the Chatham House Rule. While GAIA and SOMO have sought to accurately reflect the exchange, the organisers have not independently verified all statements, data points or sources referenced during the discussion.

Defining the Scale of Overproduction

The energy transition has placed lithium-ion batteries at the centre of global industrial and climate strategy. But a structural imbalance has emerged: global manufacturing capacity for lithium-ion batteries is now estimated at being between two and five times greater than current demand. In 2023, global demand across electric vehicles and stationary storage reached approximately 950 GWh; by 2025, announced manufacturing capacity was approaching 8 TWh against projected demand of 1.6 TWh. In China alone, capacity is roughly five times current demand — a gap expected to persist well into the 2030s.[2]



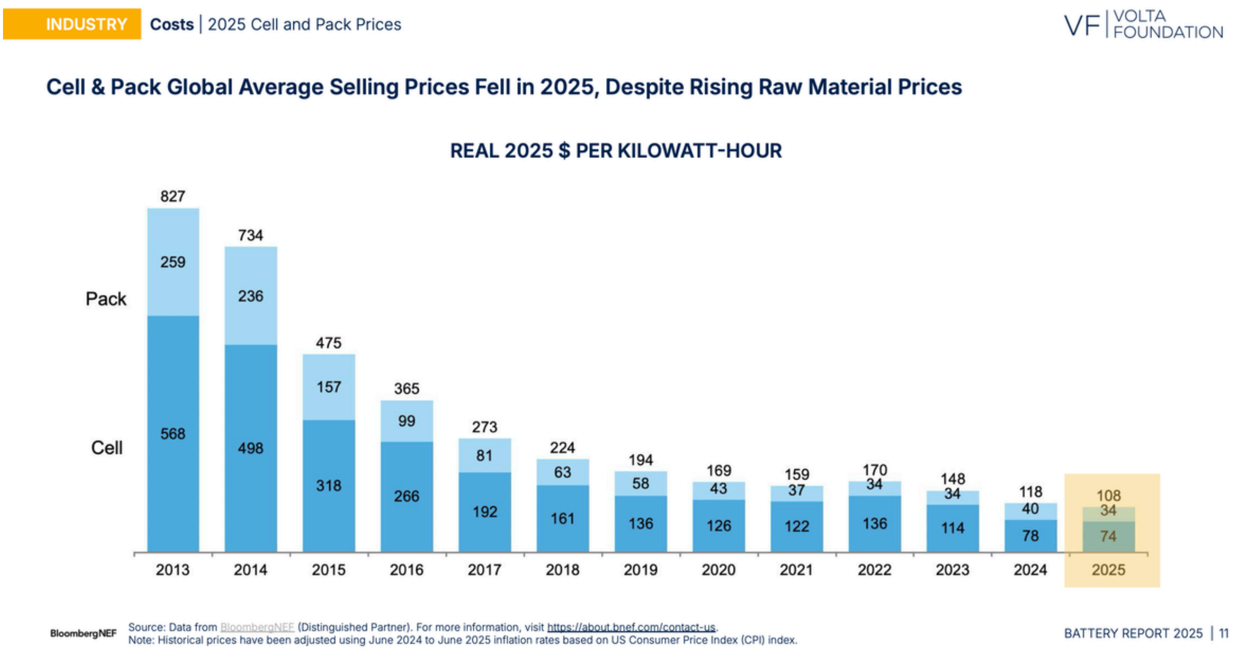
Industry data presented at the session showed that cell production grew from 1.6 TWh to 2.3 TWh between 2024 and 2025, with 65% of cells using lithium iron phosphate (LFP) chemistry, 20% destined for energy storage, and 86% produced in China.



[2] McKerracher, C. (2024, April 19). China already makes as many batteries as the entire world wants. BloombergNEF. https://about.bnef.com/insights/clean-transport/china-already-makes-as-many-batteries-as-the-entire-world-wants/

DEFINING THE SCALE OF OVERPRODUCTION

Pack prices have fallen to record lows — around $84/kWh in China in 2025, approximately 50% cheaper than in North America or Europe. [3] Profit margins across most of the battery value chain are extremely thin or negative, particularly for LFP cathode active material producers. This suggests that the current overproduction dynamic is not only environmentally and socially costly, but also financially unsustainable for many actors across the value chain.



Participants noted that the extractive pressures facing communities in mineral-producing countries should be considered in light of the scale of manufacturing capacity, which already vastly exceeds projected demand. This has significant implications for organisations working on mining impacts and human rights, as well as for those advocating for mineral demand reduction strategies.

[3] Volta Foundation. (2026, January 24). 2025 battery report. https://volta.foundation/battery-report-2025

Session 1: Drivers of Overproduction

Discussions in the first block identified a cluster of overlapping structural drivers, compounding and reinforcing one another.

A structurally decoupled supply chain with time lags and demand misjudgement

A supply chain gap of particular significance was identified: **a lack of coordination mechanisms between mining, manufacturing and end-use demand.** Cobalt, lithium, and nickel are extracted under long-term contracts or spot market arrangements, with mining-affected communities bearing the environmental and social costs regardless of whether the batteries produced from those minerals are even needed.

Car makers' demand misjudgement compounds this trend: virtually every car company projected it would at least maintain its market share during the EV transition, producing aggregate internal forecasts that consistently exceeded the actual market size. When growth disappointed, surplus capacity had already been committed.

Battery supply chains operate across very different timescales. A new lithium mine requires up to ten years from project initiation to first production. Battery cell production responds to demand signals on a much shorter horizon. This mismatch creates a **'bullwhip effect'**: demand signals amplify as they move upstream, leading to over-investment in mining and materials capacity relative to actual end-use demand. For companies competing on a one-to-two-year horizon for market share, it can be more costly to underproduce than to overproduce, further feeding the cycle.

State-directed industrial policy and subsidies

Battery manufacturing has been designated a **national strategic industry in China**, supported by an estimated $100 billion in subsidies over the past decade, alongside demand-stimulating measures such as EV purchase tax exemptions. This strategic framing has also emerged in the EU through the Net Zero Industry Act and in the US through the Inflation Reduction Act, contributing to parallel capacity build-outs in Western markets.

Profit-driven competition in a linear market economy

A broader analytical framing offered during the session was that overproduction is not simply a policy failure or a market malfunction — it is, in large part, **a rational outcome of a linear economic system.** When the incentive structure rewards throughput over value retention, companies respond by optimising for the first transaction: producing at scale, pricing low, and externalising costs. Repair, reuse, second-life applications, and recycling are not incentivised by this system; their costs are shifted to other actors further down the chain.

Battery companies operate in a market where **scale, learning-curve effects, and first-mover advantage** are decisive. As production volumes increase, unit costs fall — creating strong incentives to overbuild capacity in order to outcompete rivals and lock in automaker contracts. In an oligopolistic market dominated by a small number of large players, this dynamic intensifies: overbuilding capacity becomes a rational strategy to crowd out competitors, regardless of near-term demand.

Within China, local governments compete with one another to attract gigafactory investment — through cheap land, preferential loans, and tax incentives — to drive local GDP and employment. This competition lacks national coordination, leading to technology convergence and massive overbuilding across regions. The dynamic echoes patterns seen in other industrial sectors where subnational competition amplifies rather than rationalises investment.

Lack of standardisation of battery cells, modules and packs

A specific and underappreciated driver identified in the discussion was the **absence of standardisation for EV battery cells, modules, and packs**. Carmakers typically book production capacity for cells specifically designed for a given vehicle model under take-or-pay contracts. When demand falls short of projections, surplus cells cannot easily be redirected to other models or sold on the open market — because they were purpose-built.

Session 2: Consequences of Overproduction

The second session addressed the question of who bears the costs of battery overproduction and who captures its benefits. The picture that emerged was one of highly unequal distribution: costs carried disproportionately by workers, communities, and ecosystems least able to manage them; benefits concentrated among a small number of dominant market actors.

Disproportionate losses to ecologies, communities and economies in the Global South and examples from Latin America

Latin America exemplifies a broader pattern: the region contains significant deposits of lithium and other transition minerals, the extraction of which can cause severe and often **irreversible harm to ecosystems of extraordinary biodiversity and cultural significance — in areas where defending the environment is among the most dangerous activities in the world.** Regulatory reforms are weakening environmental protections, fast-tracking permitting without adequate cumulative impact assessments, and, in some contexts, **criminalising community protest.** Cases were raised of multiple mining projects planned within the same watershed as an already-dried-up stream — the kind of planning failure that overproduction pressure exacerbates.

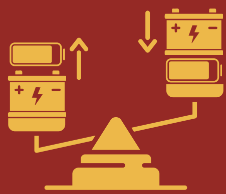
Latin America's structural role — supplying cheap raw materials while processing, manufacturing, and much of the added value occurs elsewhere — reproduces a pattern of **unequal ecological exchange with well-documented macroeconomic consequences**, including balance of payments constraints, foreign debt, and limited fiscal space. Participants argued that these dynamics can be further reinforced when debt repayment pressures from international financial institutions encourage continued dependence on extractive exports.

Workers bear disproportionate costs across the supply chain

This investment race and public incentives to produce batteries - building factories, hiring workers - comes with **minimal binding social or environmental conditionalities.**

This governance failure is shared across all major producing regions and is not unique to China. Workers bear the costs at every stage of the battery life cycle: occupational safety violations in mining, precarious employment in highly subsidised manufacturing with no binding decent work standards, and toxic exposure in informal recycling operations, already prevalent in China and across the Global South for lead-acid batteries and now lithium-ion. When markets correct, it is workers who absorb the adjustment.

Surplus cheap and hard-to-recycle batteries undermine repurposing and recycling



A central tension explored in the session was that the very cheap batteries produced by overcapacity **structurally undermine so-called circularity.** When the price of a new battery is lower than the cost of diagnosing, disassembling, and repurposing or recycling an old one, the economic rationale for circularity collapses. Responsible producers of batteries that embed circularity design principles are at a competitive disadvantage relative to those selling the cheapest available product.

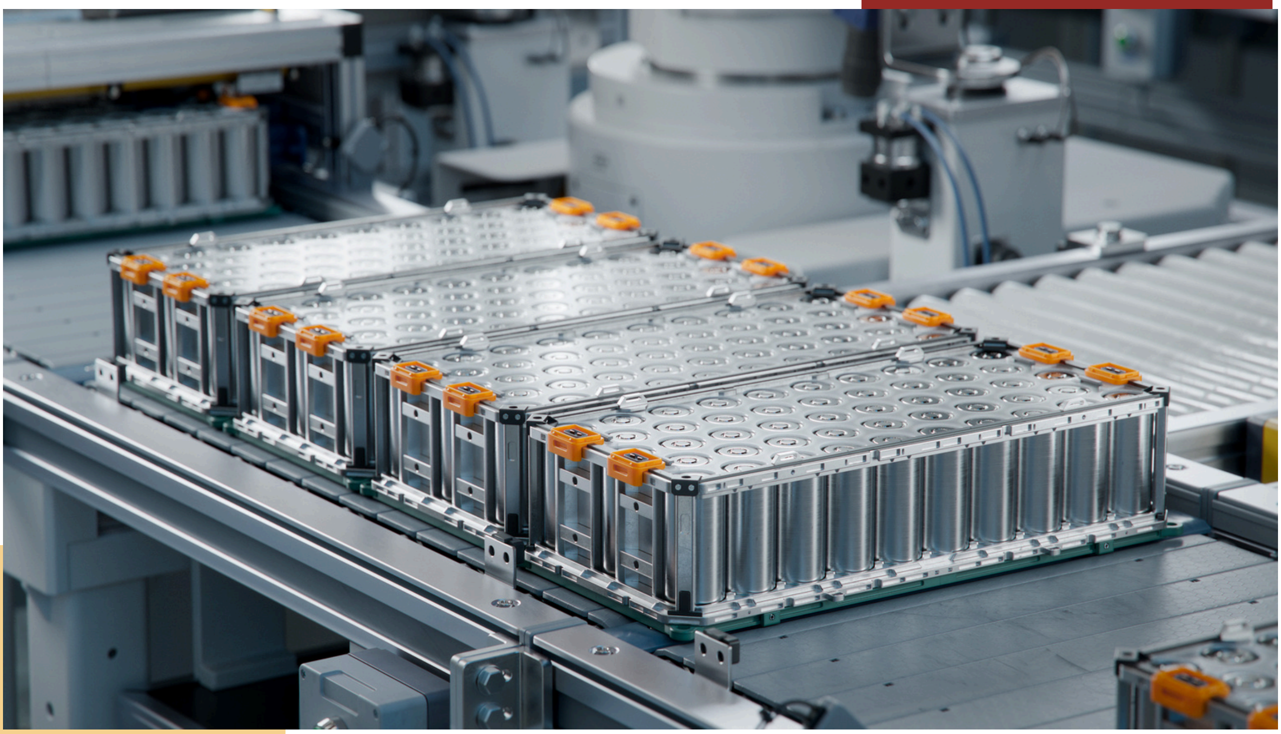
The challenge is compounded by the **diversity of cell formats driven by the absence of standardisation**. The lack of standardisation of battery cells, modules and packs **forecloses second-life applications** of surplus cells, because the diversity of formats makes repurposing technically and economically challenging. What is more, nickel manganese cobalt (NMC) and LFP batteries cannot be recycled in the same facilities, making it difficult to justify investment in either chemistry's recycling infrastructure when market share projections for each are uncertain.

The LFP chemistry challenge is particularly acute. LFP cells — which now constitute 65% of production — contain no cobalt or nickel, meaning the economic value of recovered materials is primarily limited to lithium. With lithium prices volatile and low, the **economics of LFP recycling are challenging**. It was noted that LFP recycling may become economically viable at scale from approximately $25,000/tonne of lithium, roughly the current price. But the volume of surplus LFP batteries entering the market creates an environment that continues to disincentivise investment in recycling infrastructure needed at scale.

The demand reduction assumption reconsidered

The conventional logic — that reducing demand for personal EVs reduces mineral demand, which in turn reduces mining — was interrogated by participants against the structural reality of overproduction. **Where production is driven by subsidies, geopolitical competition, and corporate survival logic rather than by demand signals, reducing consumer demand may not automatically translate into reduced extractive pressure in the short-term.** Production may simply continue and find other outlets, whether through expanded stationary storage applications, export to markets with weaker regulatory oversight, or stockpiling.

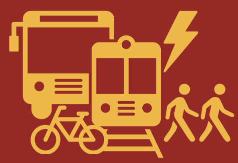
Demand reduction remains essential as a long-term strategy for reducing resource use and extractive pressure, as well as supporting resilience in consumer countries. Participants argued that demand-reduction campaigns may need to be coupled with more direct interventions targeting the structural drivers of production to limit extractive pressure in the short term.



Session 3: Pathways Towards a Just Transition

The final session explored strategies that could simultaneously support rapid decarbonisation, reduce mineral demand and extractive pressure, and advance justice and equity. Participants drew on experience from China, Latin America, and the EU policy context to develop a range of complementary approaches.

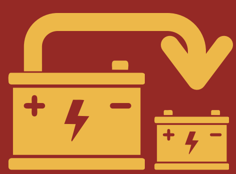
Mobility system transformation and modal shift



One of the most significant levers identified for long-term resilience and mineral reduction was through **modal shift and mobility system transformation.** Reducing reliance on personal electric vehicles, and prioritising public transit, shared mobility, two- and three-wheelers, and walking can reduce both transport emissions and the total volume of batteries — and therefore minerals — required. A participant working on sustainable transport in China noted the scale of the existing e-bus fleet there as evidence that shared electric mobility is already viable and deployed at scale; the challenge lies in aligning policy incentives across levels of government around this direction rather than around personal vehicle ownership.

It was observed that policymakers at the city and transport levels are not typically thinking about mineral demand for batteries — that framing emerges at national and international levels. An opportunity exists to align these policy conversations more systematically, ensuring that mobility planning and sustainability objectives are designed with the upstream extractive implications in mind.

Reducing battery size and demanding material efficiency



The trend towards ever-larger batteries and vehicles was identified as a significant and underaddressed driver of demand. The contrast between vehicle designs that treat battery size as a proxy for performance versus those optimised for energy efficiency and power capability — without continually increasing the size of the pack — illustrates that the current trajectory is a design and marketing choice, not a technical necessity. Participants noted the potential of an energy-efficiency standard for electric vehicles as a future policy tool, while acknowledging that the current political environment in markets where EV mandates are under pressure makes near-term action difficult.

Policy levers on end-use and end-of-life

A broader concept discussed was the **'strategic use of materials'** as developed by Zero Waste Europe (ZWE): prioritising scarce resources for essential applications, aligning with planetary boundaries, and combining circularity with demand reduction rather than treating recycling as a substitute. This framing was presented as a way to advance resource use reduction in a policy environment dominated by a competitiveness and supply security narrative.

Participants identified policy levers on end-of-life management, mostly anchored in experiences from EU policymaking, acknowledging that these may have limited impact on the overall production volumes:

> **Mandatory extended producer responsibility (EPR) regulations** requiring battery producers to invest in end-of-life collection and recycling infrastructure from the outset, internalising those costs into the price of new batteries
>
> **Recycled material content targets** in newly produced batteries, creating demand for secondary materials and incentivising investment in material recycling
>
> **Material recovery requirements** ensuring that the value of recovered minerals flows into secondary supply chains rather than being lost
>
> **Durability and repairability standards** — the EU Battery Regulation already includes requirements on battery design for durability, as well as removability and replaceability provisions for certain battery categories, providing a starting point for longer product lifetimes that could be strengthened

Examples of emerging regulation in Chile, Mexico, and Brazil were noted as evidence that these approaches are being adopted in regions that are also major mineral suppliers — creating a potential alignment between producer and consumer country interests.

Finding champions and building new alliances

A recurring theme was the need to find champions **willing to step out of the race to the bottom** and build alliances that connect the ends of the value chain, which currently operate in isolation. Mining-affected communities in Latin America, the DRC, and Indonesia are often absent from battery technology and industrial policy debates in Europe, China, and North America — a gap identified as both a governance failure and a political opportunity. Participants emphasised that public and common interest, rather than market dynamics or geopolitical competition, must lead decision-making, supported by planning frameworks that make the cumulative impacts of extractive projects visible and governable.

Demand reduction as resilience and de-escalation

Reducing material demand was reframed not only as an environmental justice strategy but as a **resilience and de-escalation strategy** for consumer countries. Where geopolitical competition for scarce resources risks intensifying conflict and supply disruption, reducing dependence through demand reduction, circularity, and modal shift offers a path towards greater strategic autonomy and reduced exposure to export controls already emerging from dominant producer countries. This framing offers potential for building broader political coalitions around demand reduction that extend beyond environmental civil society.

Key Themes and Observations

Across the full session, six cross-cutting themes emerged:

1

Overproduction is structural, not cyclical.

The scale and persistence of the capacity-demand gap reflects deliberate industrial policy, corporate business models within increasingly oligopolistic markets, and misaligned incentives — not a temporary market imbalance that will self-correct. Addressing it requires structural intervention, not patience.

2

The costs are widely distributed; the benefits are concentrated.

Workers, communities, and ecosystems in mineral-rich regions absorb the environmental and social costs of overproduction. Economic value is captured primarily by a small number of dominant market players and by states pursuing geopolitical advantage. This distribution reflects structural features of the current system rather than an unintended outcome. Existing incentives for companies and states often favour continued expansion, market share growth and value capture over efforts to transform unequal value chains and address supply chain governance gaps.

3

Mineral demand figures in the literature are a floor, not a ceiling.

Organisations working on mining impacts need to assess extractive threats not only against demand-side forecasts, but also against the scale of current overproduction, plus the installed and announced manufacturing overcapacity. The gap between these is substantial and growing.

4 Battery design and standardisation are underappreciated levers for both overproduction and circularity.

The absence of standardisation for battery cells, modules, and packs is both a driver of overproduction and a barrier to circularity. Purpose-built cells cannot be redirected when demand disappoints, and typically not suitable for second-life applications. The trend towards ever-larger batteries is similarly a design and marketing choice, not a technical necessity. Mandatory ecodesign requirements (cell format standards, material efficiency, durability, and design for second-life) could interrupt both dynamics.

5 Demand reduction is necessary, but broader action is needed.

Reducing consumer demand for personal EVs is an important long-term direction and a resilience strategy. But where production is structurally decoupled from demand, it may not on its own reduce extractive pressures in the near term. A wider portfolio of interventions targeting the supply side — business model reforms, corporate accountability measures, social conditionalities on subsidies, coordination mechanisms, and procurement standards — is required.

6 A new narrative is needed.

Prosperity measured in ever-growing volumes of material consumption is incompatible with planetary boundaries and a just transition. Articulating an alternative — based on access, mobility, sufficiency, and circularity — is both a political necessity and a strategic opportunity for the organisations represented in this conversation.

Possible Next Steps

Participants identified several areas for potential follow-up:

Deeper research on the **governance gap, corporate business models, and the structural disconnect between mining, manufacturing, and end-use demand,** as well as the coordination mechanisms needed to overcome them

Strategic mapping of **where alliances are currently fragmented** and which connections between mining-affected communities, labour organisations, and circular economy advocates in different regions could be strengthened

Development of **ecodesign and standardisation policies, penalties and incentives** - including cell format standardisation, material efficiency standards, design for repurposing, and battery size limits

Exploration of **LFP recycling economics** and the policy conditions — including material content requirements, EPR, and pricing mechanisms — that could make it investable

Development of **narrative framing** that positions demand reduction, circularity, and modal shift as resilience and de-escalation strategies accessible to a broader coalition of political actors beyond environmental civil society

Consideration of **whether mineral demand projections adequately capture the extractive risks facing frontline communities,** and whether a 'capacity-adjusted' demand framing could provide a more complete picture

Participating Organisations

The following organisations were represented at the learning circle. This discussion paper respects the Chatham House Rule: views, insights and arguments are not attributed to any individual participant or organisation.

11th Hour Project
Beijing Circular Economy Strategies
Benchmark Minerals
Climate & Community Institute
Ellen MacArthur Foundation
Ford Foundation
Fundación Ambiente y Recursos Naturales (FARN)
Fundación Tanti
Global Alliance for Incinerator Alternatives (GAIA)
Hopper-Dean Foundation
IndustriALL Global Union
International Council on Clean Transportation (ICCT)
ITDP China
Klinger Lab
Renault
SOMO
Volta Foundation
Zero Waste Europe