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# Proving the Model with Implementation Pilots

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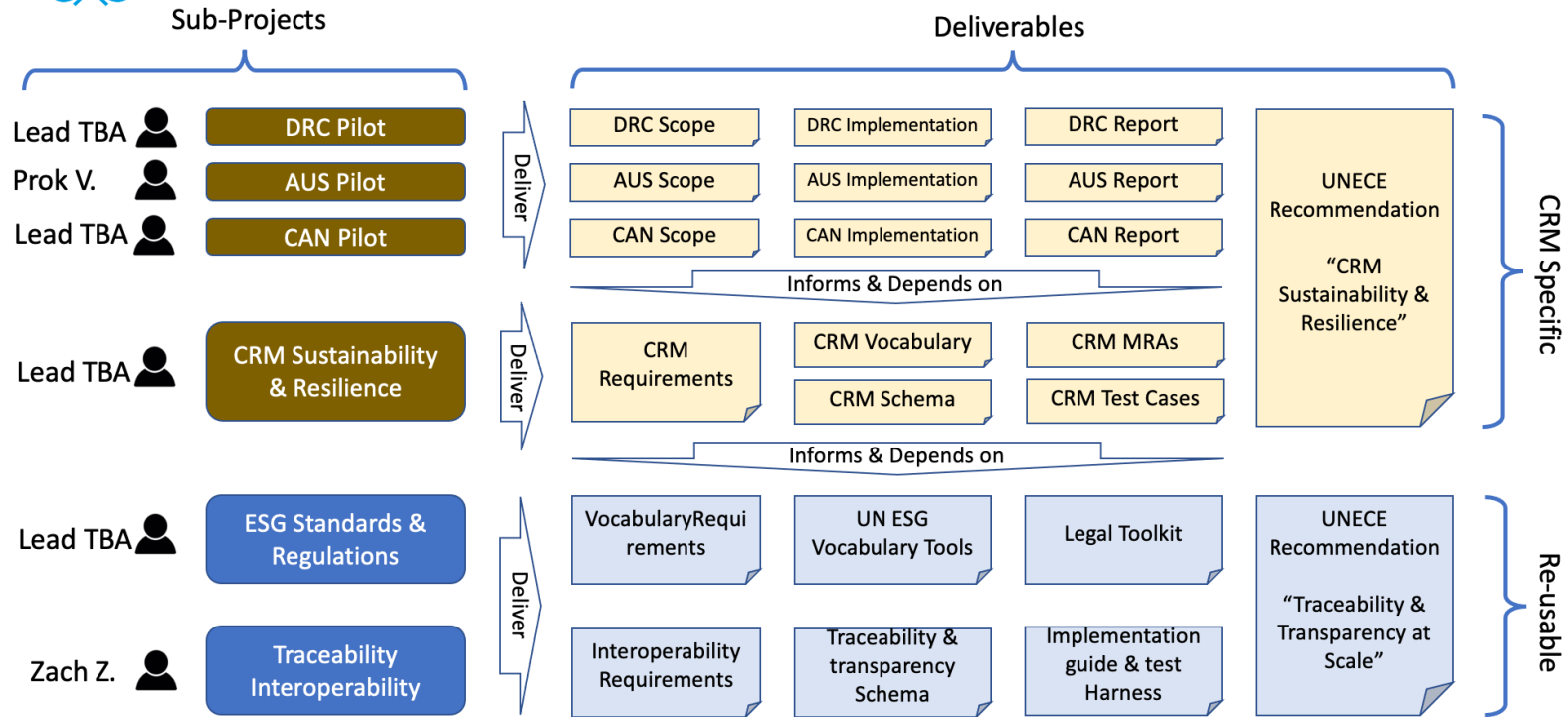
# Critical Raw Materials Project Pilots



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The purpose of [this project](#) is to combat greenwashing and uplift verifiable critical raw materials supply chain resilience and sustainability.

- **Sustainable** supply chains are designed to minimize environmental impacts and maximise human welfare.
- **Resilient** supply chains are designed to avoid risky dependencies and can withstand disruptions.

# Critical Raw Materials Pilots Specific Scope

DRC Pilot

DRC Focus:

This pilot focus is critical mineral supply chain **social & governance** criteria (human welfare) and **peer-to-peer trust** model

AUS Pilot

AUS Focus:

This pilot focus is critical mineral supply chain **resilience and guarantee of origin/provenance verification**

CAN Pilot

CAN Focus:

This pilot focus is critical mineral supply chain **sustainability and environmental** credentials verification

SCOPE

# Current State of CRM supply chain sustainability

- Despite efforts to date, **environmental and social impacts from mining still occur** (e.g., child labour, forced labour, habitat destruction, water stress, impacts to First Nations land and culture)
- **Greenwashing** practices have eroded trust in reporting and resulted in a crack down on the quality of reporting and management activities with particular focus on **data quality, credibility, traceability, and transparency**
- The CRM value chain is a global web of interactions, **increased pressure to disclose credible and verifiable sustainability information** and the rise of technology-based platforms like ‘product passports’
- **ESG not fully reflected in the CRM Market**



## Lack of transparency and regulations to create sustainable supply chains

- Today, battery materials and components are often fraught with **unethical working conditions** (e.g., forced or child labour) and **negative environmental effects** (e.g., water usage and pollution).
- Due to a **lack of supply chain transparency**, downstream suppliers might not appropriately identify and address such risks.
- At the same time, **regulatory requirements** preventing social and environmental issues are falling short.

# Greenwashing: ESG Market and Reporting Challenges



Sustainability reporting and management continues to face challenges:

- A **plethora of available standards** to communicate sustainability information
- A **large suite of environmental, social and governance (ESG) indicators**
- **No common reporting standard**, globally or nationally
- **Data quality and comparability issues**

Source: European Securities and Markets Authority (ESMA)



# Comparing ESG regulatory mechanisms: Australian FBI CRC Report case

- Two certifications
- Five sustainability reporting and assurance standards
- Three Australian regulatory mechanisms

Environmental Category	Social Category	Governance Category
Air quality	Cultural heritages	Customers
Climate change	Employment protection, fair labour, and terms of work	Business integrity
Greenhouse gas emissions and emissions management	Stakeholder engagement	Compliance
Ozone-depleting substances and pollutants	Community health, safety, and wellbeing	Resettlement
Biodiversity, ecosystems, protected areas	Occupational health and safety	Transparency
Energy	Human and community rights	Corruption and competition
Habitats and mine closure	Risk management	Risk management
Tailings management	Supply chain due diligence	
Environmental management		
Consumption and efficiency		
Noise and vibration		
Supply chains		
Waste		
Water		



Source: FBI CRC, 2022

# Comparing ESG regulatory mechanisms: Australian FBI CRC Report case findings

At a high level, this heat map of data requirements shows the significant variation across reporting type.

Plus some similarities, for example

**Greenhouse Gas reporting** requirements are **similar**, however, variation in inclusion of scope 1,2, and 3 is still present, despite the considerable effort globally to standardise this indicator

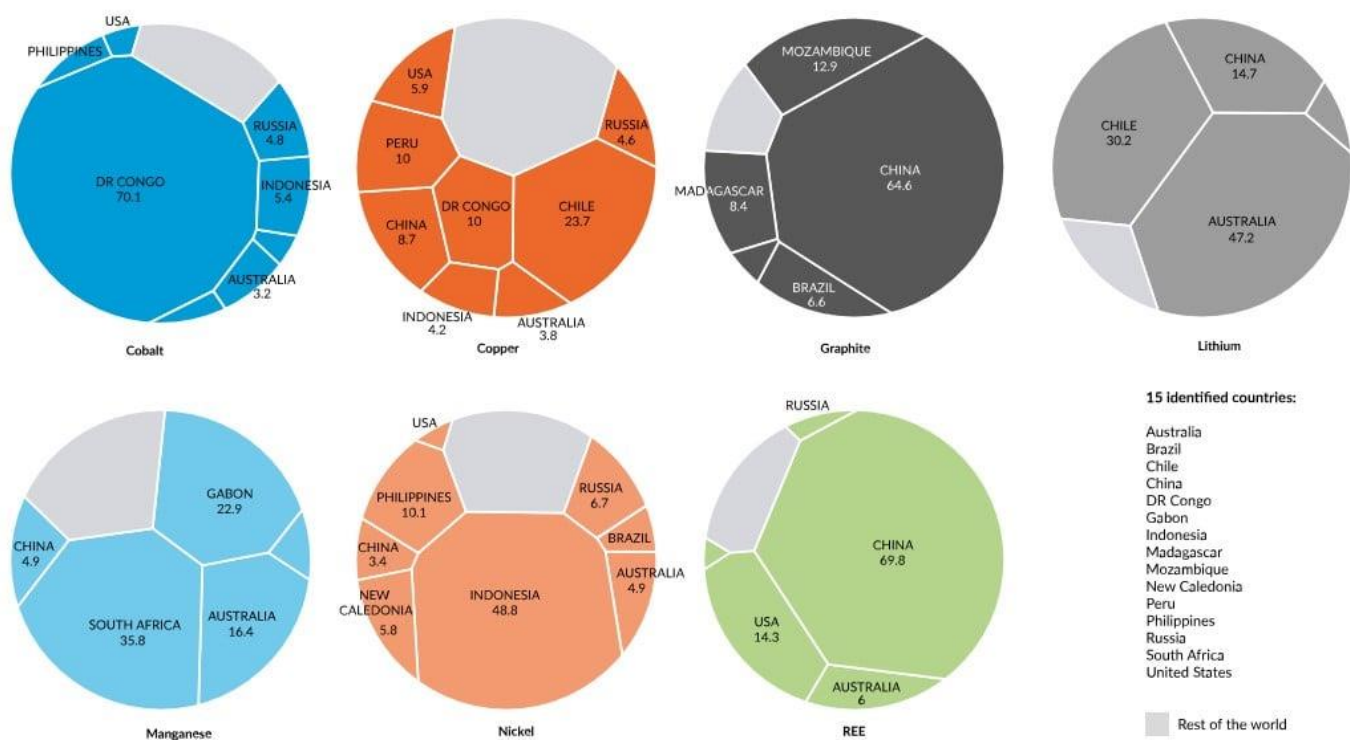
**Similar indicator titles, often required different types of data** and described different methodologies to evidence performance under the indicator.

For example,

**Water related data requirements varied significantly**, with some (e.g., IRMA, GRI, RMI, TSM) specifying a watershed stewardship approach which places a greater emphasis on assessing the impacts of water use beyond the mine site and requires complex modelling of regional water availability and use. While others tended to require data on water extracted and water discharges only.

Mechanism classification	Reporting boundary									
	Product	Site		Site or Company			Company			
Non-Assured standard			RMI			GRI	OECD	CDP		
Assured standard						TSM			DJSI	
Certification	CERA	IRMA								
Regulatory mechanism				NPI	ECR					NGER
<b>Environmental Reporting and Management Requirements Count</b>										
AIR QUALITY	4	17	3	4	5		7			
CLIMATE CHANGE			2			2	2		8	8
GREENHOUSE GAS EMISSIONS MANAGEMENT	1	2	1			2	2		6	
GREENHOUSE GAS EMISSIONS	2	2	3			2	3		3	3
OZONE-DEPLETING SUBSTANCES & POLLUTANTS				3			6			
BIODIVERSITY, ECOSYSTEMS, PROTECTED AREAS	1	5	4		6	4	3		10	
ENERGY			1	1			17		10	7
HABITATS AND MINE CLOSURE		4	3				4		1	
TAILINGS MANAGEMENT		3	4	2		4			3	
ENVIRONMENTAL MANAGEMENT	3		2							
CONSUMPTION AND EFFICIENCY	2		1				5			
NOISE AND VIBRATION	1	2	2							
SUPPLY CHAINS		1					4		1	
WASTE	4	12	1	1			10			
WATER	2	17	8	3		4	24		15	7
<b>Social Reporting and Management Requirements Count</b>										
CULTURAL HERITAGES	1	4			1					
EMPLOYEE PROTECTION, FAIR LABOUR AND TERMS OF WORK	6	12	12			2	13			15
STAKEHOLDER ENGAGEMENT	3	13	9		1	5	3	24	2	
COMMUNITY HEALTH, SAFETY AND WELLBEING	4	5	1				2			
OCCUPATIONAL HEALTH AND SAFETY	3	8	6			4	9			
HUMAN AND COMMUNITY RIGHTS	8	6	6				2			4
RISK MANAGEMENT		3				4				2
SUPPLY CHAIN DUE DILIGENCE		1	1				2			2
<b>Governance Reporting and Management Requirements Count</b>										
CUSTOMERS							1			1
BUSINESS INTEGRITY	3	1	5				3		2	2
COMPLIANCE	1	3					4			
RESETTLEMENT		5	3							
TRANSPARENCY		5	8				1		2	15
CORRUPTION & COMPETITION	2	1	1				4			4
RISK MANAGEMENT		1	2							4

# Resilience: Critical Mineral Needs and Supply

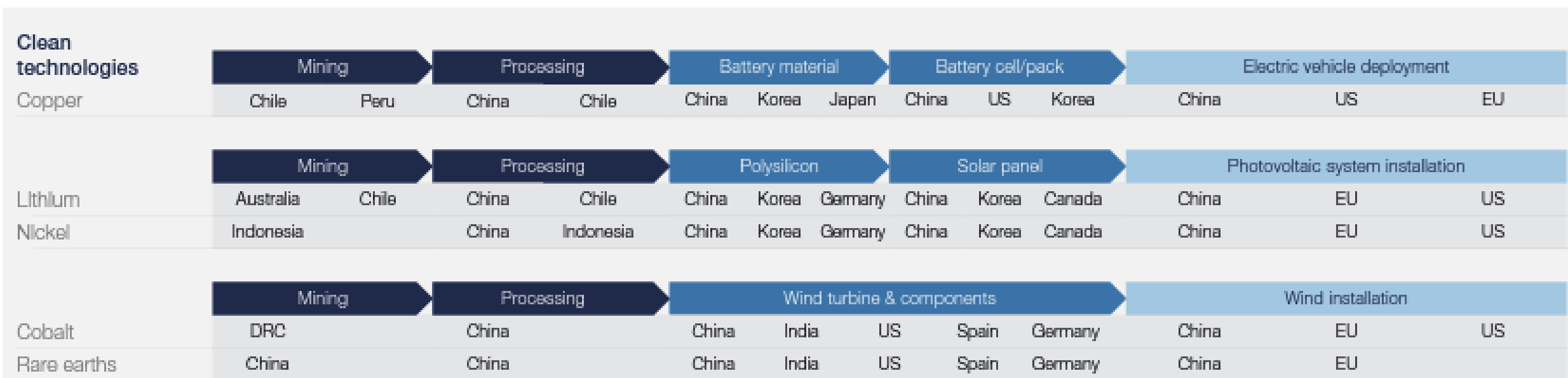


Source: World Bank, 2020

Source: CEEW, 2023



# Current CRM Indicative Supply Chain



**Source**

Leruth, et al. 2022.<sup>20</sup>

**Note**

Largest producers and consumers are indicative only.

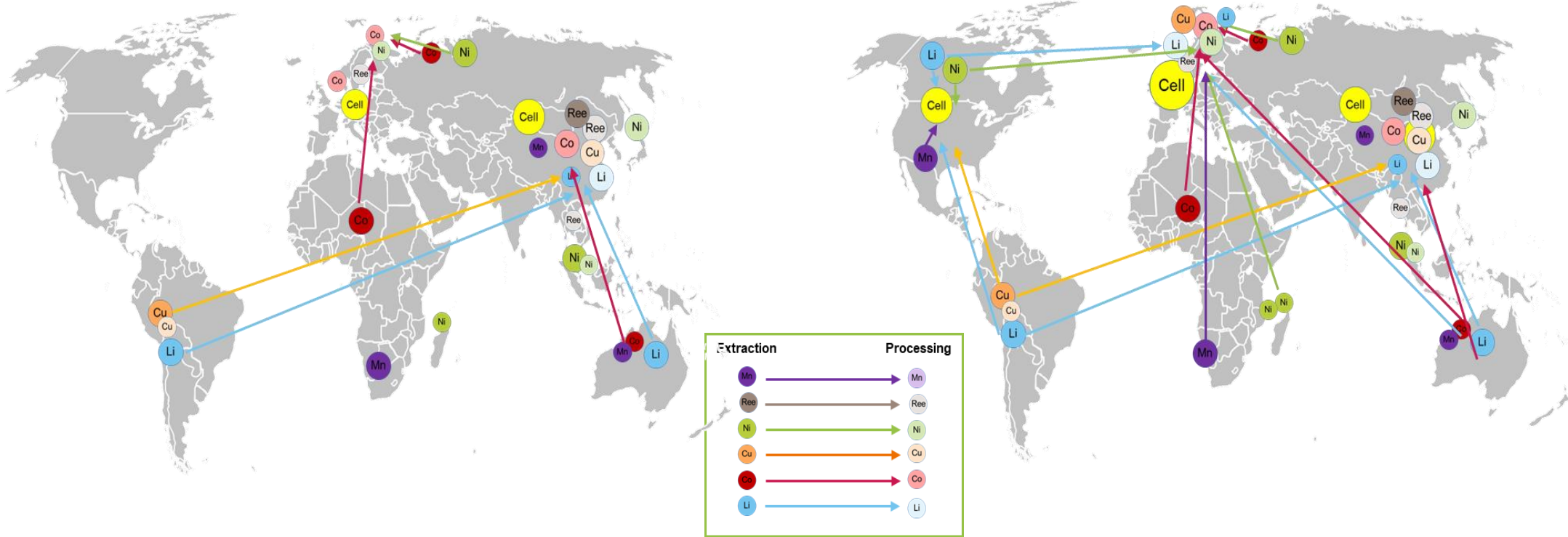
# Diversified supply chains

## Today:

- General flow towards Asia
- Supply chain lacks diversity

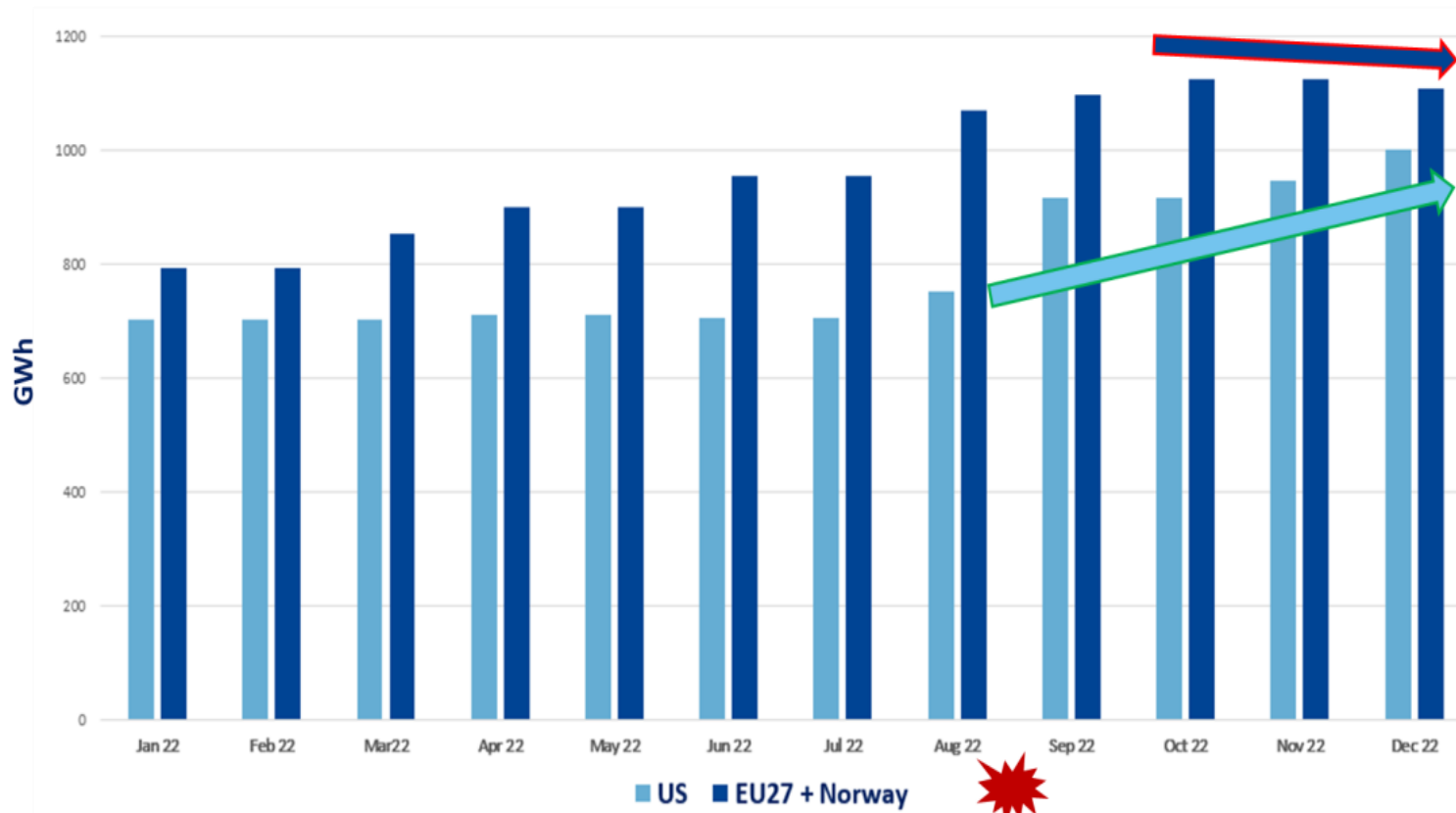
## Future:

- General flow towards end market
- More diverse supply chains



# US policies impact on investment acceleration in manufacturing facilities

Announced cell production capacity during 2022, in pipeline for 2032



Announcement of IRA

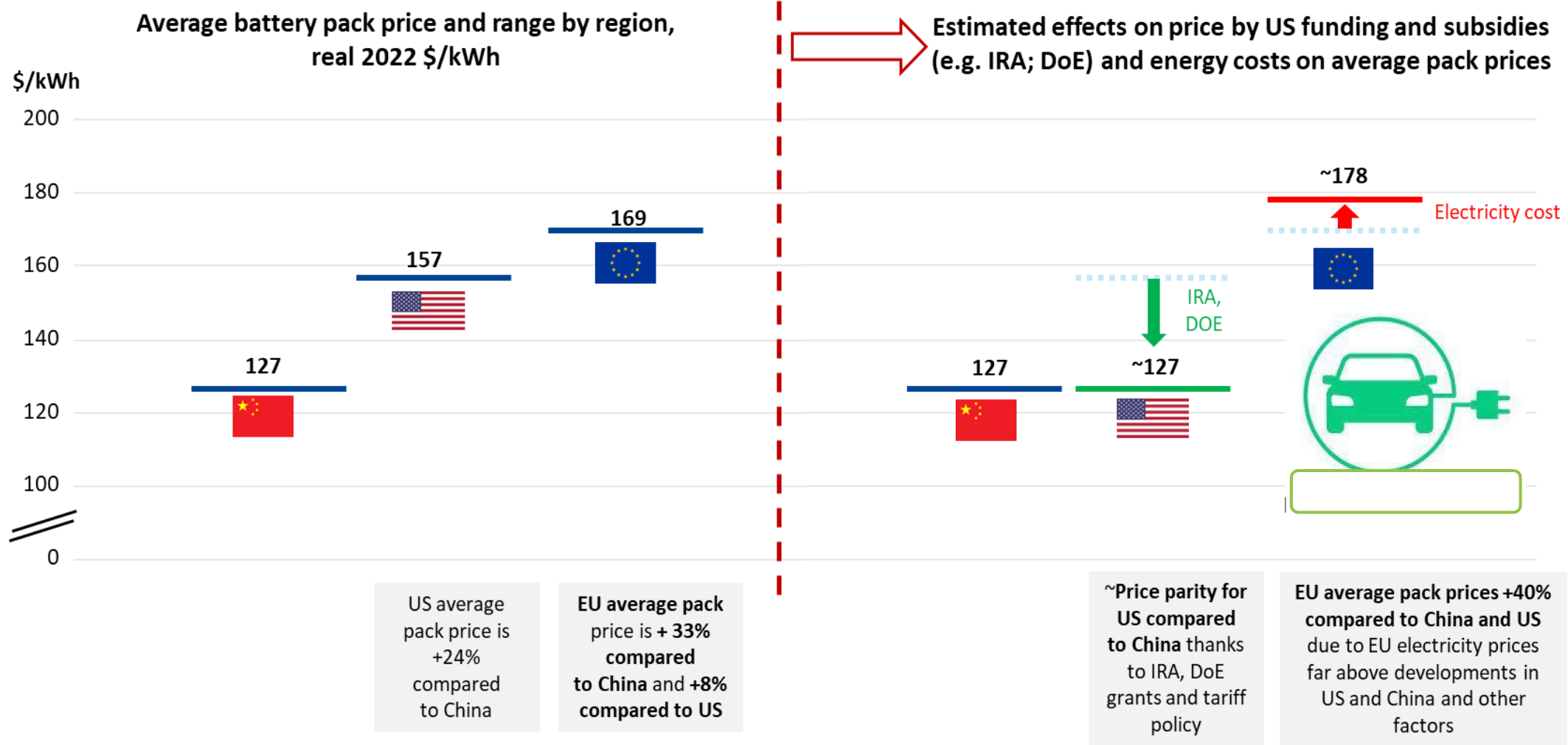
## IRA accelerates the growth of a US battery value chain

- Manufacturers have announced more than \$120 billion in investments in the last eight years
- 42% of that \$120 billion was announced in just the last six months – since Congress passed the IRA*

**That investment will support massive numbers of new U.S. electric vehicle-related jobs.**

- Manufacturers have announced 143,000 new jobs in the electric vehicle sector in the last eight years
- 32% of those jobs were announced in just the last six months – since Congress passed the IRA*

# Global Battery Market: an unbalanced playing field



# The new EU initiatives to accelerate the growth of a domestic industry

## The Temporary Crisis and Transition Framework (TCTF)

- Member states are allowed to **provide state aid** up to a maximum of 150 to 350 million EUR (depending on location) for the production of batteries, their key components or the recovery of raw materials.
- Member states are allowed to **match state aid** offered to non-European locations.

## The Critical Raw Materials Act (CRMA)

- Regulation for **domestic capacities and diversified supply chains** for strategic raw materials based on EU consumption by 2030:
  - 10% extraction,
  - 40% processing,
  - 15% recycling
  - and not more than 65% sourcing from a single third country.

## The Net Zero Industry Act

- Simplification of **regulatory framework** and fast track permitting for net-zero technologies.
- **Scaling up manufacturing** of net-zero technologies. At least 550 GWh/a battery production and coverage of at least 40% of the demand for electrodes.



# The EU regulatory framework accelerates the transition towards sustainable batteries

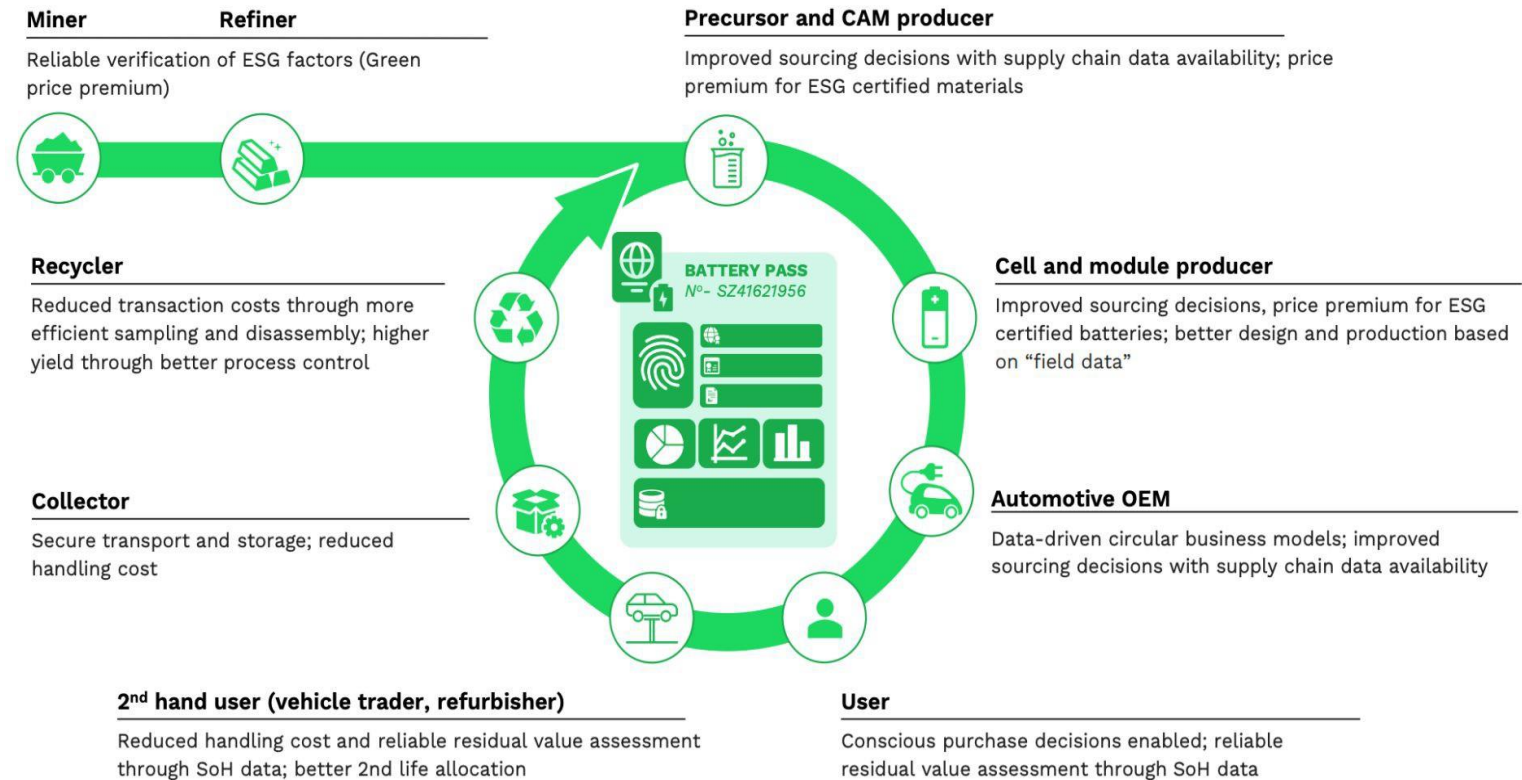
## Key elements of the EU's climate and sustainability efforts

<b>EU Green Deal</b>	Comprehensive plan to make the EU climate-neutral by 2050, safeguard biodiversity, establish a circular economy and eliminate pollution, while boosting the competitiveness of the European industry and ensuring a just transition for the regions and workers affected.
<b>New Industrial Strategy</b>	Framework guiding the development of the industrial sector, aiming to support the EU's broader goals of climate neutrality, digital transformation, and economic growth.
<b>Circular Economy Action Plan</b>	Initiative promoting the sustainable use of resources, especially in resource-intensive sectors with high environmental impact, such as textiles and construction.
<b>Strategic Action Plan on Batteries</b>	Initiative introduced in 2018 as part of the Clean Mobility Package and updated in the context of the EU Green Deal aiming at developing a sustainable and competitive battery value chain in Europe with the objective to ensure a reliable and sustainable supply of batteries.
<b>Battery Regulation</b>	Proposed in 2020, replacing the EU Battery Directive, and likely entering into force in August 2023, it is part of the EU Green Deal and complements the Strategic Action Plan for Batteries by providing a legal framework aiming to make batteries sustainable throughout their entire life cycle.

# EU Battery Regulation- providing a legal framework for sustainable batteries throughout their lifecycle

- Strengthening the functioning of the internal market by ensuring a level playing field through a common set of rules
- Promoting a circular economy and creation of more resilient supply chains through recycling
- Reducing environmental and social impacts throughout all stages of the battery life cycle

## The battery passport will unlock major value along the entire value chain



# EU Battery Regulation: Carbon Footprint

## Battery passport reporting requirements

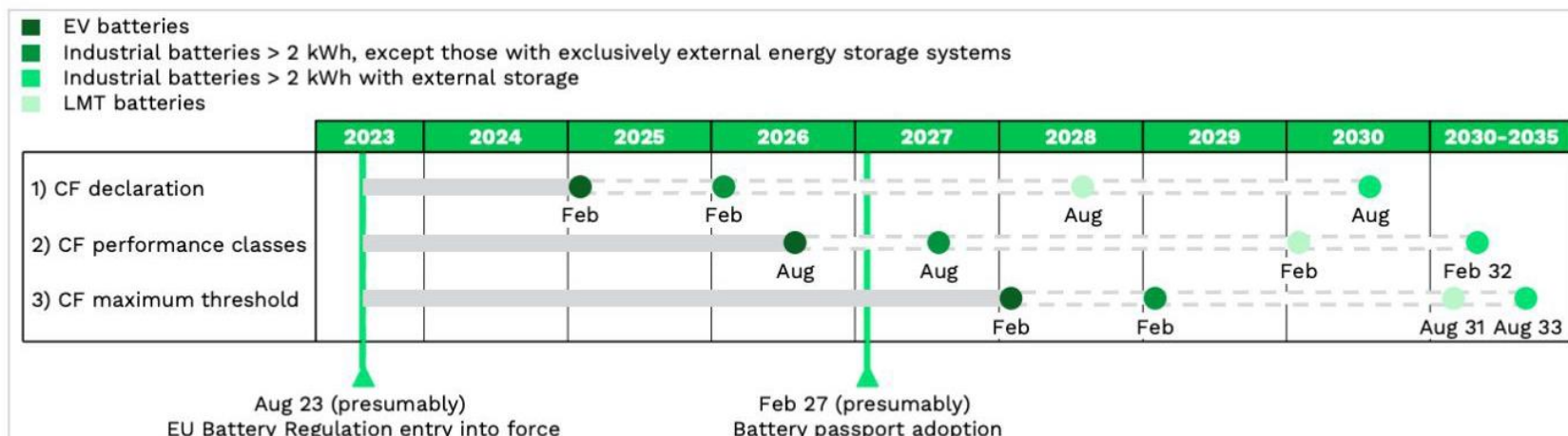
Battery Regulation Annex XIII, part 1, reference to Article 7(1-2)

### Data attributes:

- declared carbon footprint
- share of battery carbon footprint per life cycle stage
- carbon footprint performance class
- web link to public carbon footprint study
- administrative information about the manufacturer
- information about the geographic location of the battery manufacturing facility
- information about the battery model for which the declaration applies

## Carbon footprint timeline

- The CF requirements are implemented in 3 steps (deadline varies for different battery categories):
  - 1) Carbon footprint declaration
  - 2) Carbon footprint performance classes
  - 3) Carbon footprint maximum thresholds (not included in battery passport)
- For EV and industrial batteries w/o exclusively external storage, the CF declaration becomes mandatory before and for LMT batteries and industrial batteries with exclusively external storage after the battery passport adoption
- Only for EV batteries, the CF performance class needs to be reported before battery passport adoption

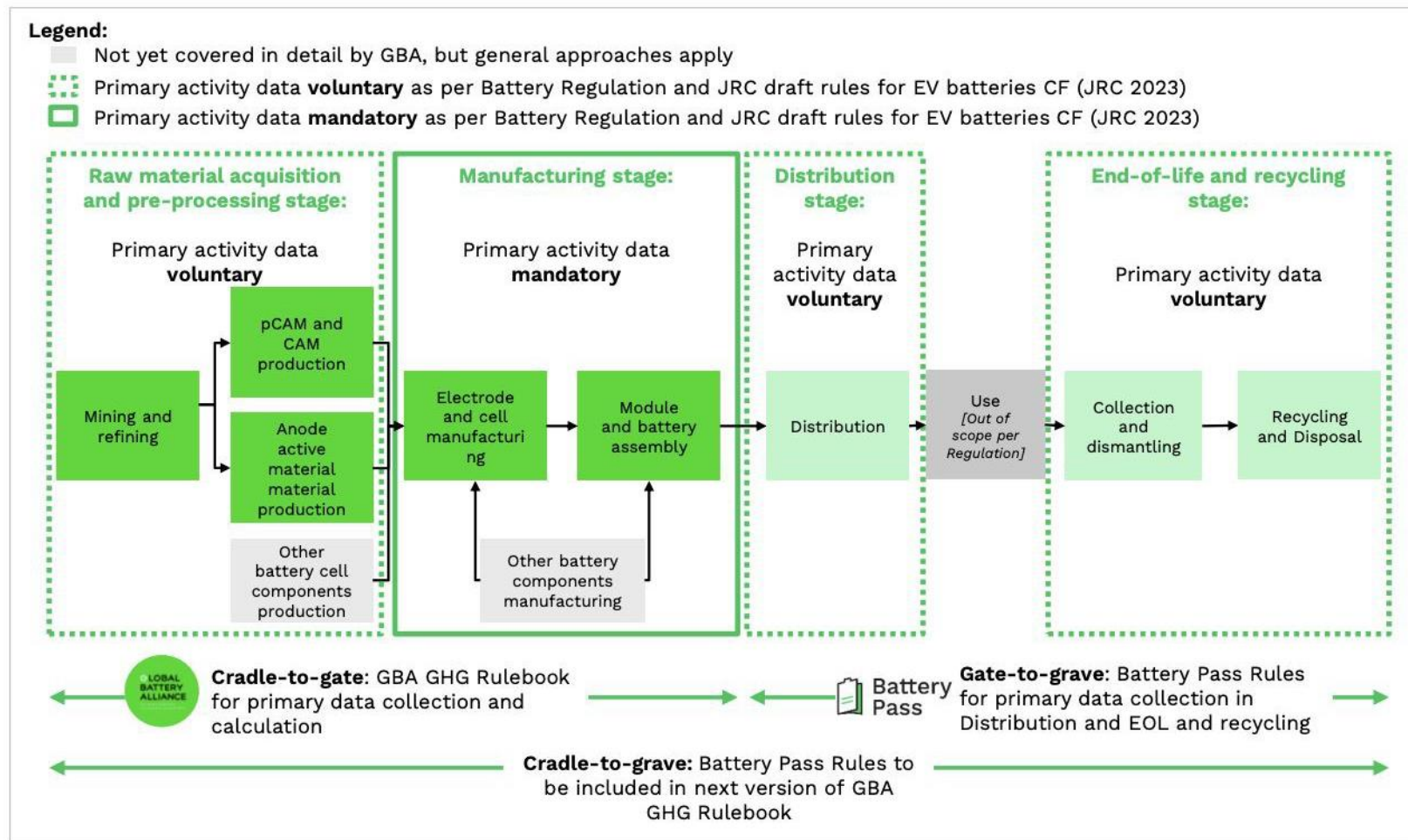




# Carbon Footprint Data Collection

## Battery Pass carbon footprint assessment and recommendation

- Current developments indicate that primary** (company- or supply chain-specific) data are **only required for the “Main product production / Manufacturing”** life cycle stage which sets the focus of company-specific carbon footprint data on this narrow scope while in other life cycle stages, secondary (i.e., average) data may be used.
- The Battery Pass consortium recommends calculating the battery carbon footprint **based on the GBA GHG Rulebook and Battery Pass Rules<sup>1</sup>** to provide the data basis for measuring and optimising real-world CFs along the value chain – both documents build on existing standards in compliance with the regulatory requirements and cover the battery life cycle cradle-to-grave based on **guidance and prescriptions for the collection and usage of company-specific data end-to-end.**



# EU Battery DPP: 7 Content Clusters

## 1. General battery & manufacturer info

**Overall 7 data attributes, e.g.,:**

- Battery identification (unique identifier)
- Manufacturing information (identity, place, date)
- Battery category
- Battery weight
- Battery status

## 2. Compliance, label, certifications<sup>1</sup>

**Overall 6 data attributes, e.g.,:**

- Symbols and labels: separate collection, cadmium and lead, carbon footprint
- Meaning of labels and symbols
- EU declaration of conformity and its ID
- Compliance of test results

## 3. Battery carbon footprint

**Overall 7 data attributes, e.g.,:**

- Carbon Footprint (5 metrics)
- Web link to Carbon Footprint study
- Carbon Footprint performance class

## 4. Supply chain due diligence

**Overall 1 data attribute:**

- Due Diligence Report
- *(Potential voluntary additions)*

## 5. Battery materials and composition

**Overall 11 data attributes, e.g.,:**

- Battery chemistry
- Critical raw materials
- Hazardous substances and their impact
- Materials used in the cathode, anode, electrolyte

## 6. Circularity and resource efficiency

**Overall 20 data attributes, e.g.,:**

- Manuals for battery removal, disassembly, dismantling
- Component part numbers & spare parts information
- Safety measures/instructions & extinguishing agent
- Pre- and post-consumer recycled content shares (nickel, cobalt, lithium, lead)
- Renewable content shares
- Information on the role of end-users in waste prevention and management
- Information on battery waste collection, second life preparation, and recycling

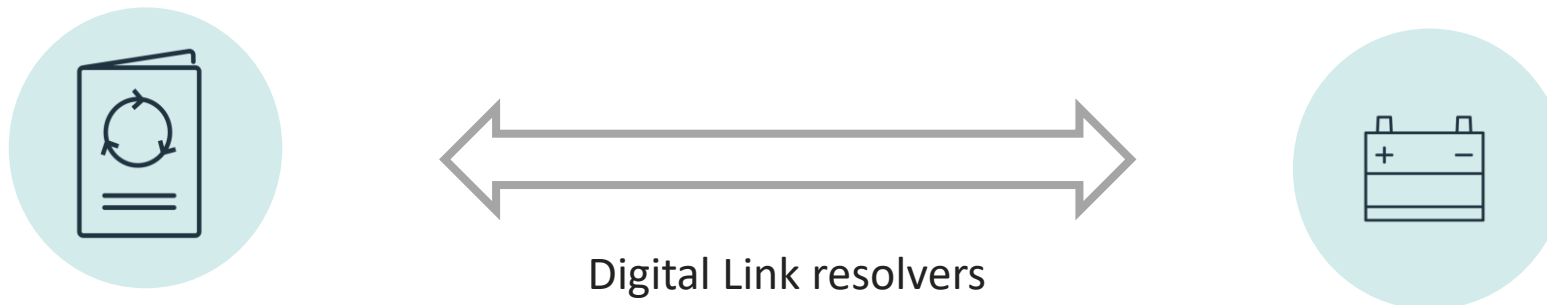
## 7. Performance and durability

**Overall 38 data attributes, e.g.,:**

- Capacity, Energy, SoH, and voltage information
- Power capability information
- Energy round trip efficiency and self-discharge
- Internal resistance
- Expected lifetime
- Temperature conditions
- Negative events



# Product Passport: Digital and Physical Link



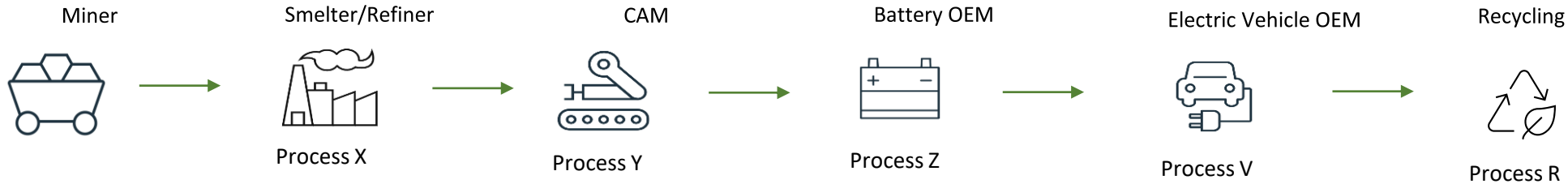
## Data Identifier Schemes:

- Sensors & measurements
- Standards & Criteria
- Audits & certificates
- Accreditations & trust
- Facilities, Equipment & Capacity

## Material unique identifiers:

- **Tagging:** machine-readable identifier, such as a barcode, QR code, or RFID tag.
- **Physical or Chemical Attributes:** Analytical fingerprinting allows the material to be traced back to its origin by analysing its chemical properties. For provenance analysis, this is seen as the “least corruptible method”.

# Provenance Validation Model



## Dispute Event Scenario

Process Y and Z Dispute if the output info from the previous step does not match the input info.  
Example: Suspected physical substitution

## Traceability Platform



Check the physical tag and digital ID

Platform verifies with attributes

## Analytical Software



Identified Product Attributes by customer checked with the software with the results needing a **low** confidence level

Disputed material samples sent to the laboratory

A cost-effective outcome with lower confidence

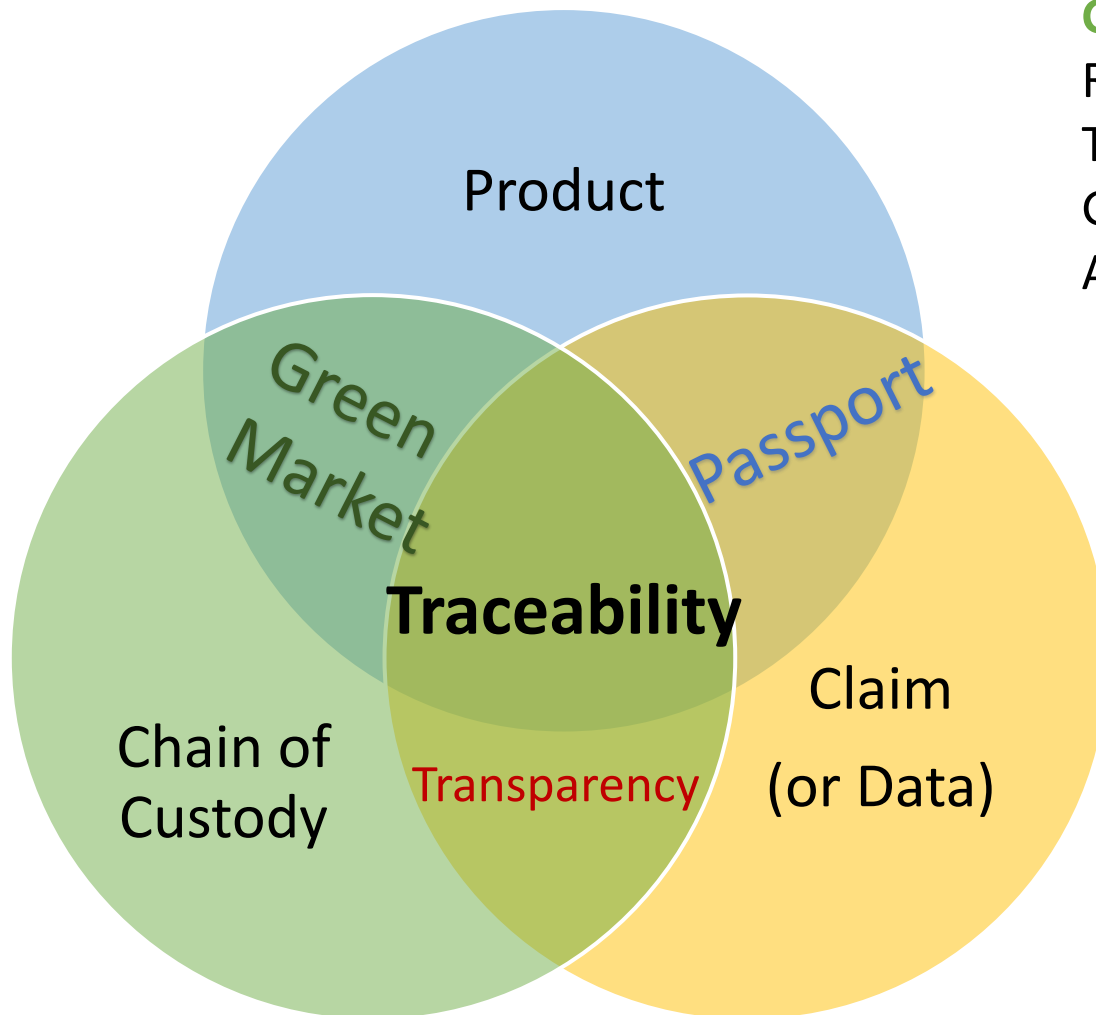
A verifiable outcome with a higher cost

## Provenance Laboratory Service



Geochemical Analysis on Material level from a verified laboratory with a **high** confidence level

# Traceability for CRM



## Green Market:

- Risk and Assurance
- Trade standardized contracts
- Guarantee of Origin (Provenance)
- Authentication and Integrity

## Product Passport:

- Identifier Schemes
- Links between Physical and Digital
- Passport attributes
- Data Authentication, Integrity and Reliability

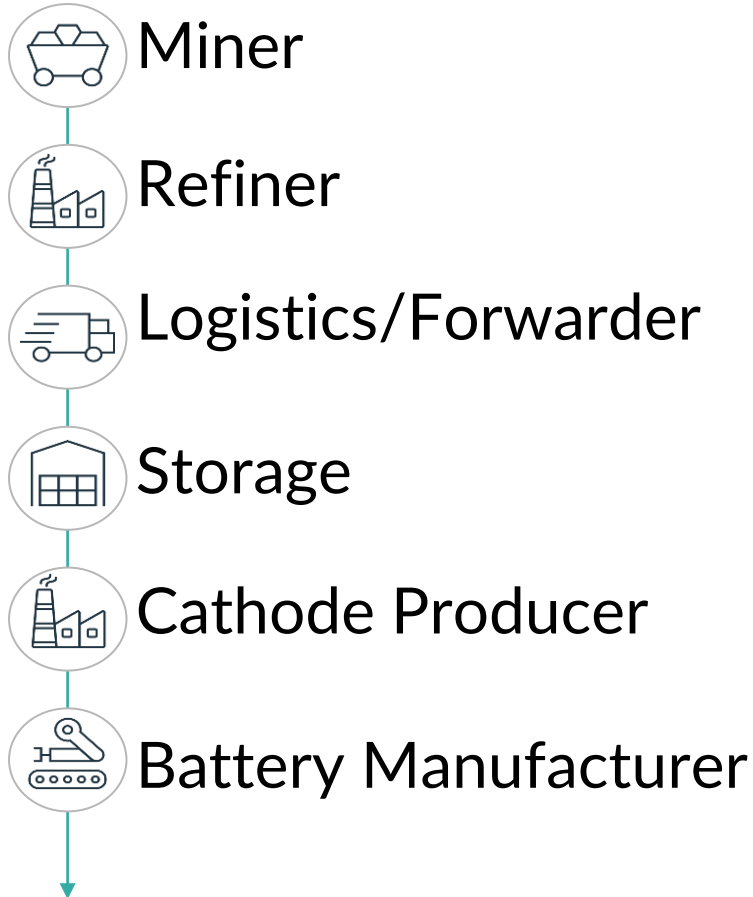
## Transparency: ESG and Regulatory

- Sensors & measurements
- Standards & Criteria
- Audits & certificates
- Accreditations & trust
- Legal/ethical considerations

# Lithium Pilot: General Approach

- Supply chain **mapping and product identification** with commercially viable definition
- **Current Data collection** at critical stages of the supply chain:
  - **Data transmission mechanisms:** Data is transmitted to a database or platform that aggregates and analyses the data to provide supply chain insights.
  - **Data analytics and communication systems:** data analytics tools to analyse the data based on definable business logic and provide insights into potential risks and opportunities.
  - **Mandatory Regulatory Documentation** via the mandatory company's traceability or chain of custody system.
  - **Interoperability framework.** Current Taxonomy disclosure statement. (eg. The EU Taxonomy)
  - **Sustainability Reporting.** Mandatory and voluntary sustainability reporting and documentation for communicating non-financial performance to investors, customers, and other stakeholders (eg. IFRS Sustainability Disclosure)
- **Provenance: Unique identification** (both physical and assigned Digital ID) to validate the commodity throughout the supply chain

# Sustainability Data Collection Approach



## Stakeholder engagement:

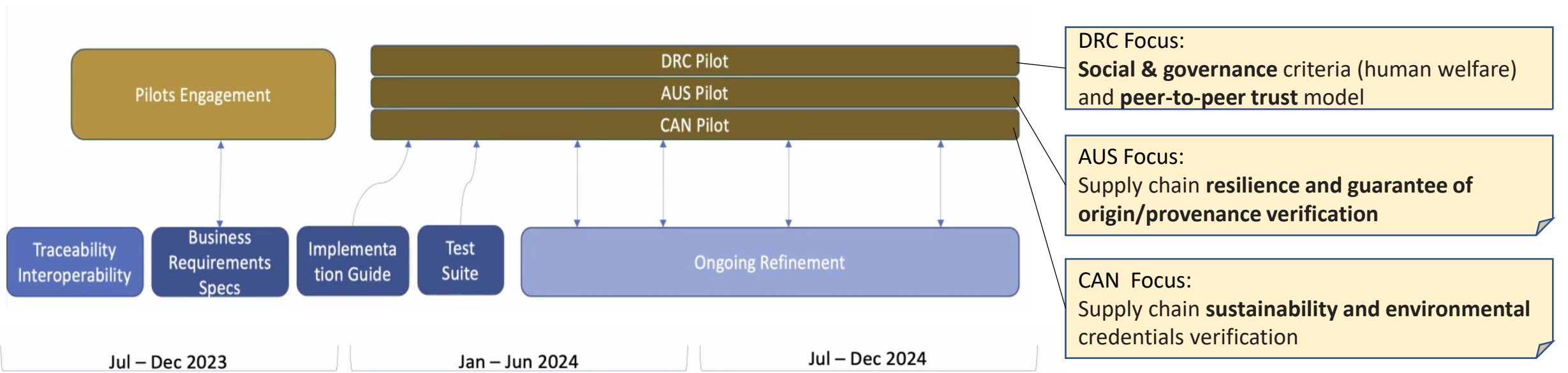
- Trust Anchors - authoritative roots of trust such as governments & national accreditation authorities
- Occurrence of reporting and/or management requirements under each ESG indicator
- Requirement to report publicly / disclose information,
- Third-party verification requirement
- Grievance mechanisms

## Additional **information on**

- The governance structure of mechanisms (development body and ongoing management)
- Mechanism type (assured or non-assured standard, certification, regulation)
- Scope of mechanism (product, site, or company)



# Pilot Implementation



## Deliverables:

Testing both traceability and sustainability standards considering the focus of each pilot on :

- **Compatibility between digital tools** and reporting platforms;
- **Identifying areas of consensus** within existing sustainability certifications



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## Thank you!

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