EV Battery Material Traceability

Advancing U.S. energy storage through standardization

Lithium Battery Recycling & Lifecycle Management Workshop, July 2025

Li-Bridge

Bridging the Lithium Battery Supply Chain Gap

“Traceability systems can enable the collection of data on product origin, geographic path, the sequence of entities that held ownership or control over the product and its physical evolution.” --IEA (2025), The Role of Traceability in Critical Mineral Supply Chains

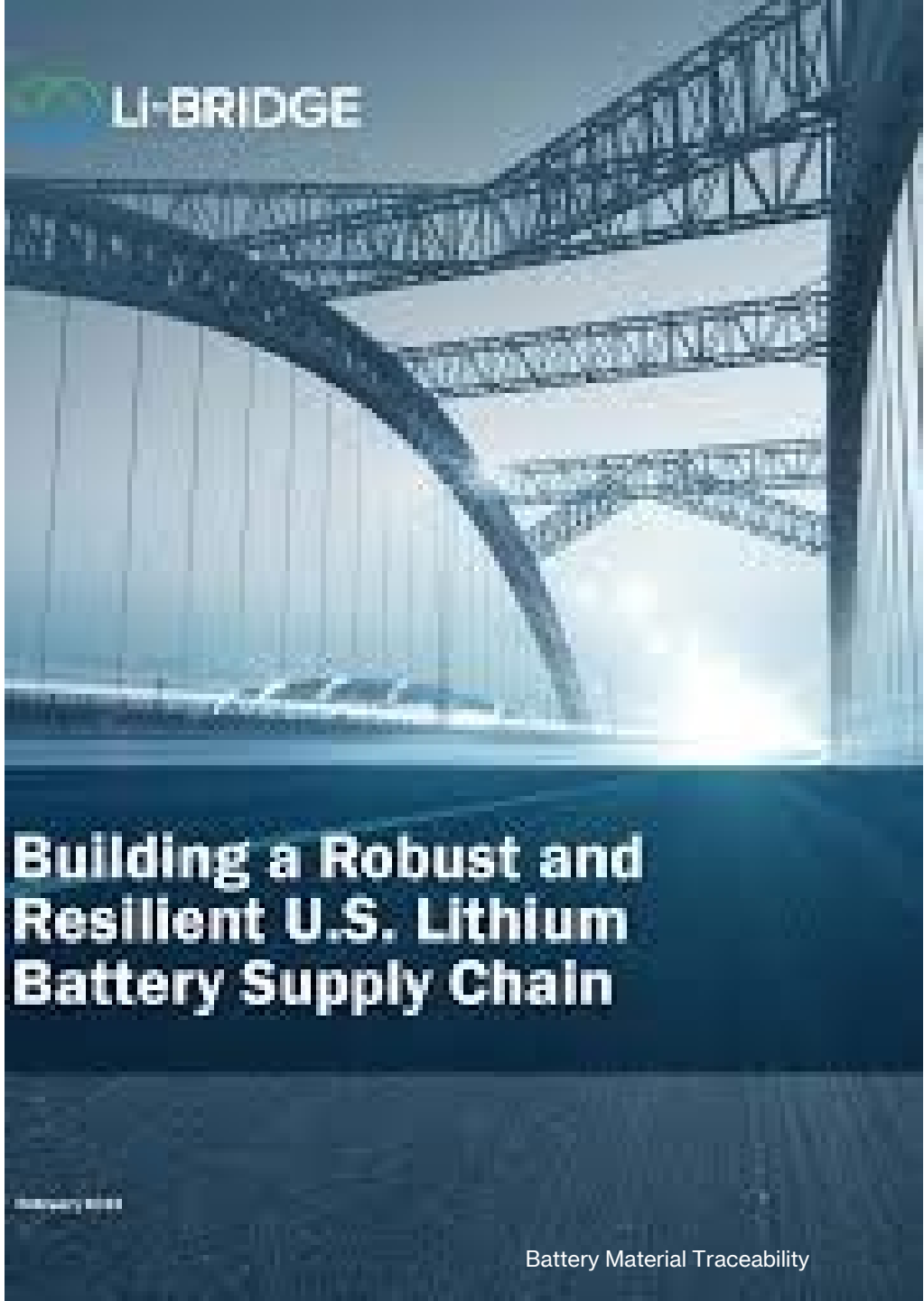
How can a traceability system for EV batteries advance the energy storage industry?

Battery Material Traceability

The U.S. Department of Energy turned to LiBridge to answer that question.

LiBridge is a public-private partnership convening government and industry to support the growth of the lithium-ion battery industry in the U.S.

It is a program within the U.S. Department of Energy's Federal Consortium for Advanced Batteries (FCAB) and coordinated through Argonne National Labs.



Traceability

FCAB, Argonne and LiBridge sponsored a meeting in August 2024 to determine the landscape of traceability.

Avicenne facilitated.

50+ representatives of automative and battery OEMs and suppliers attended.

Key takeaway:

The landscape is fragmented. Some companies are planning to comply with EU Digital Product Passport. Some are not and some are thinking about it. No common vocabulary or procedures. This leaves supply chain disorganized and inefficient. Creates friction for smaller or newer entrants.

SAE J3327 SURFACE VEHICLE EV BATTERY TRACEABILITY RECORD

Consistent, shared format and vocabulary for identifying and recording:

- Battery information
- Critical minerals contained within the battery
- Battery components
- Chain of custody information, i.e. ownership of materials, components and products along the value chain

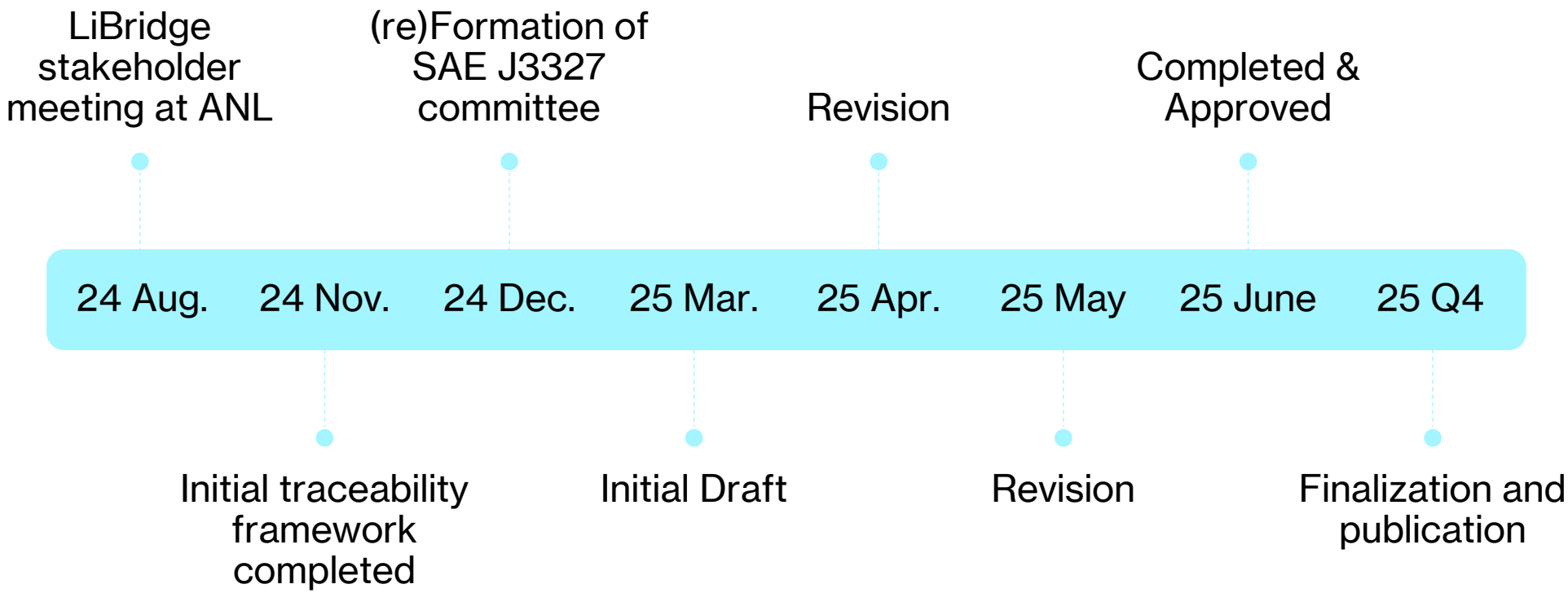
Leverage existing standardization=one common global practice.

Save time and cost by having one process for suppliers to follow; support recycling and re-use; ease compliance with EU DPP

Model a methodology for:

- Supply chain mapping and data gathering from extraction to processing to manufacturing from multiple sources
- Battery data management.

Get it done in <12 months!



Typical standardization time is 18-36 months

Number	Data	Unit	Static (S)/ Dynamic (D)	Mandatory (M)/ Recommended (R)	US/ EU/ Both (B)
6.1 Entity Identification					
6.1.1	Economic Operator (EU); Qualified manufacturer	ID	D (EU) S (US)	M	B
6.2 Battery Information					
6.2.1	Digital Identifier	ID	S	M	B
6.2.2	Date of Service	ID	S	M	B
6.2.3	Vehicle Identifier	ID	S	M	US
6.2.4	Battery Mass	ID	S	M	B
6.3. Battery Chemistry					
6.3.1	Itemized List of Applicable Critical Minerals (ACM)	String	S	M	B[1]
6.3.2	For each ACM, its associated constituent material	String	S	M	US
6.3.3	For each ACM, mass measured in kilograms (kg)	String	S	M	US
6.3.4	For each ACM, mass measured in kilograms (kg) in each **Battery Cell**	String	S	M	US
6.3.5	The number of **battery cells** incorporated into each **battery.** Note: the battery cell number should match the number provided in the **battery**	ID	S	M	US

[1] Note: The EU Digital Product Passport requires a smaller subset of critical minerals be reported: cobalt, lead, lithium and nickel.

Standard is organized to harmonize **with EU Digital Product Passport for Batteries**:

- Entity information
- Battery information
- Battery chemistry
- Extraction information
- Manufacturing and processing information
- Component information

Standard also harmonizes with **CARB ACC II standard for recycling**

The case study follows ISO standards

- **Chain of custody – Mass Balance model (ISO 13662)**
- **Traceability of rare earths in the supply chain from mine to separated products (ISO 23664)**

Essentially the case study can serve as a battery use case for both standards

How do you actually use this standard?

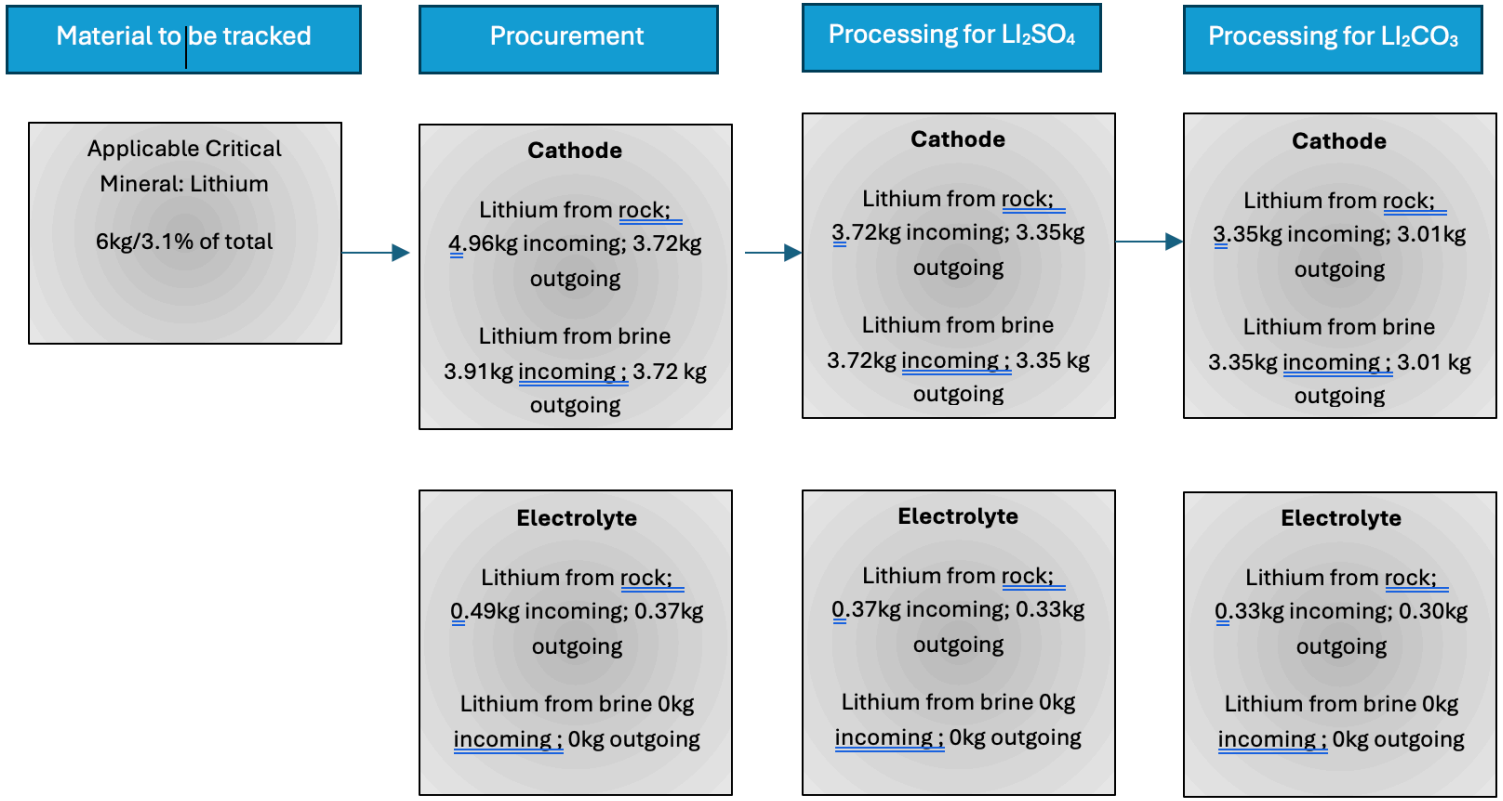


Figure 1a. shows the illustrative model in Tab 1 (Material to be tracked) and the first part of Tab 2 (Chain & Mass). Lithium for the Cathode and Electrolyte from rock and brine is procured. It is processed as Lithium Sulfate (LI_2SO_4) and Lithium Carbonate (LI_2CO_3).

Mapping your supply chain & measuring processing and manufacturing

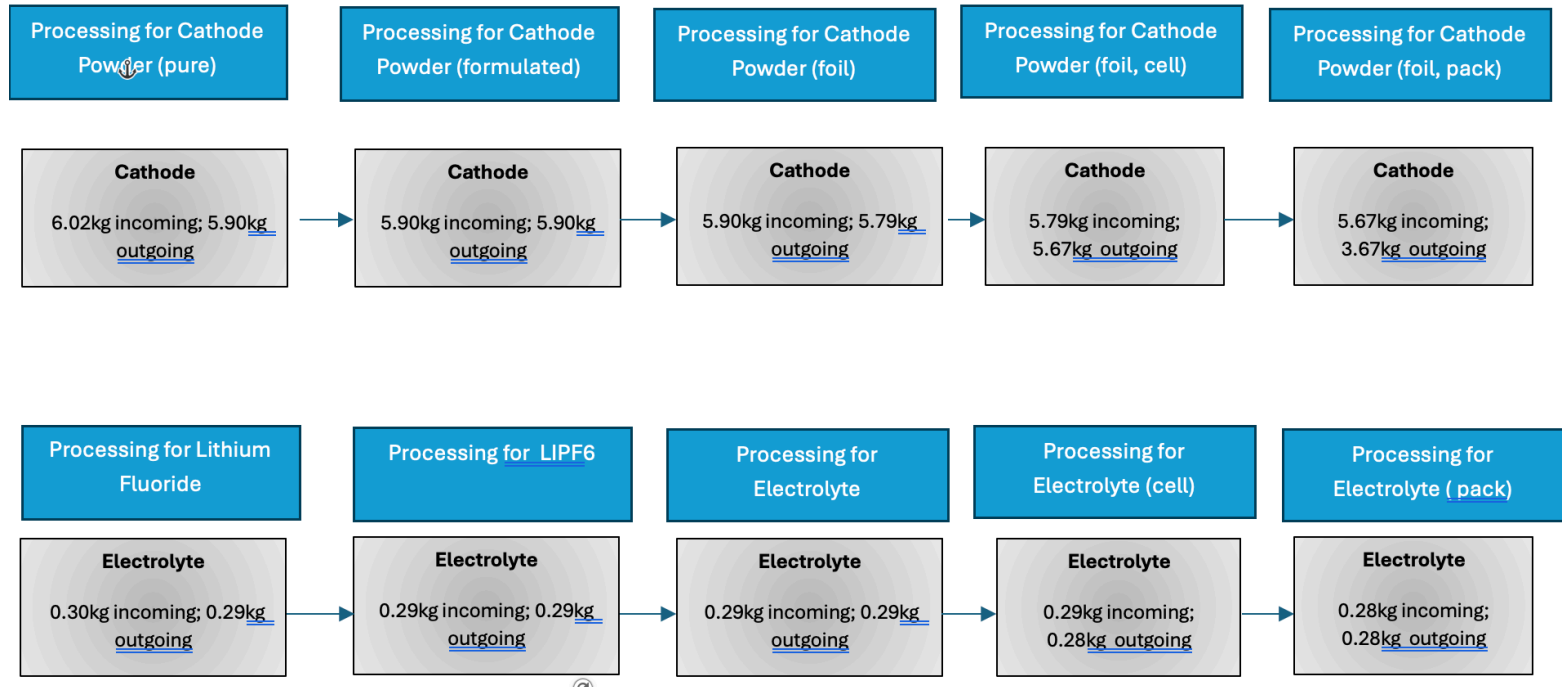


Figure 1b. shows the illustrative model in the second part of Tab 2 (Chain & Mass). The model follows Lithium for the Cathode and Electrolyte through steps that lead to the battery pack.

Measuring recycling

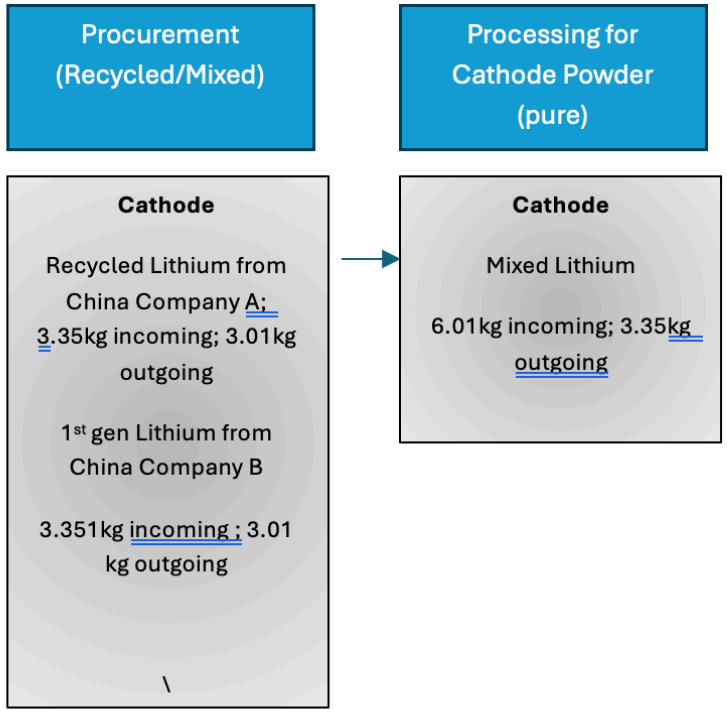


Figure 2. SAE J3327 requires accounting for inclusion of recycled materials. This illustration based on Tab 4a. demonstrates the introduction of recycled lithium in the processing sequence. It also shows the tracing of that recycled lithium, from China Company A, as it is mixed with first-generation materials from a different entity, China Company B, and a different location. The mixed, variously sourced lithium is used to make Cathode Power in pure form.

How does it advance the energy storage industries?

- Organized data collection is the foundation for
  - Supply chain mapping, lifecycle assessment & impact
  - Compliance with requirements related to critical minerals in US and abroad
  - Security and verifiability of supply chain information
  - Applicable to grid storage and military batteries
- Having a consistent methodology saves time and money by allowing a complex and geographically diverse ecosystem to share one approach

What are the consequences of the OBBB?

- OOBB terminates the 30D consumer tax credit for EVs in September 2025;
- OBBB adds Prohibited Foreign Entity (PFE) rules to 45x production tax credits which raise the importance of the data requirements in the standard:
  - Specified Foreign Entity (SFE): China, Russia, Iran, North Korea
  - Foreign Influenced Entity (FIE)
- Obtaining tax credits will require clarification of the degree of Material Assistance (MARC) from PFE in sourcing critical minerals and components.
- The standard will help industry by providing a consistent method for collecting and recording these data.

Join our committee; build on the work we've done

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Auzolan LLC

Frank Menchaca, Founder

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