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From Sample Collection to Global Collaboration:
The Impact of MRIWA on Critical Minerals Research

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FUTURE BATTERY INDUSTRIES CRC

mriwa
Minerals Research Institute of Western Australia

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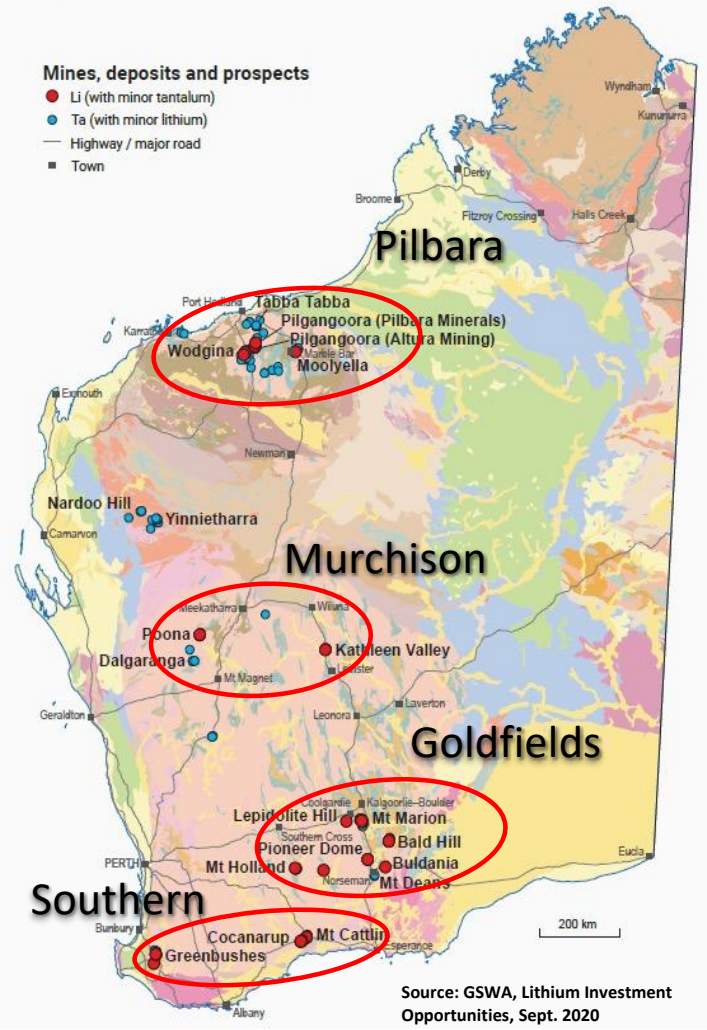
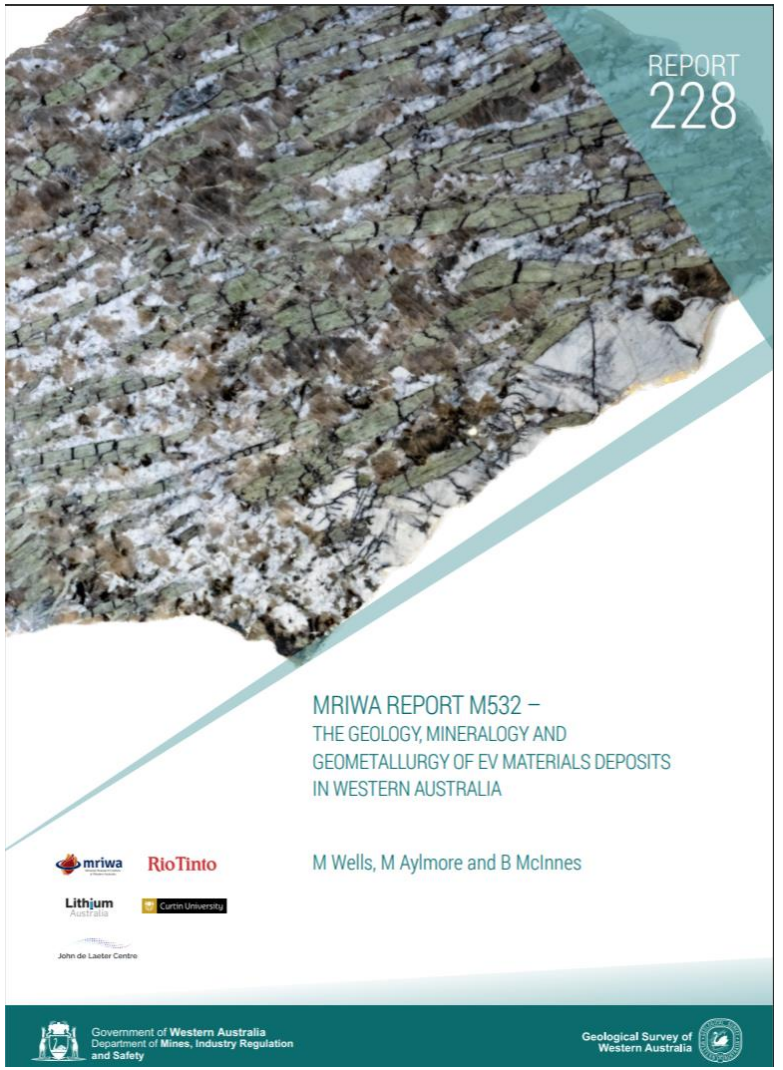
M532: Geology, Mineralogy and Metallurgy of WA Lithium Pegmatite Deposits



Download Report



Objective: Develop a geometallurgical framework that will lead to improved efficiencies in exploration, mineral beneficiation and processing techniques.

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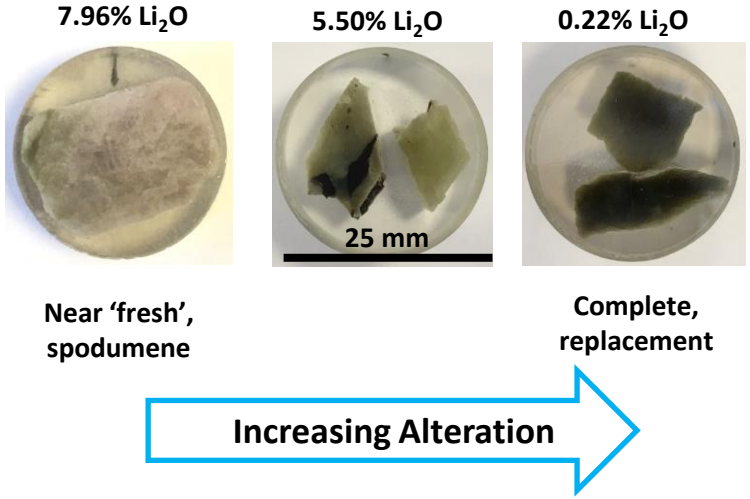
M532 Project Impacts

Geology

- Regional-scale: Geochronological correlation between timing of LCT-pegmatites and the Sclavia Superia Kenorland super-continent
- Mine-scale: Mapping of alteration types is critical to economics of hard rock Li mining

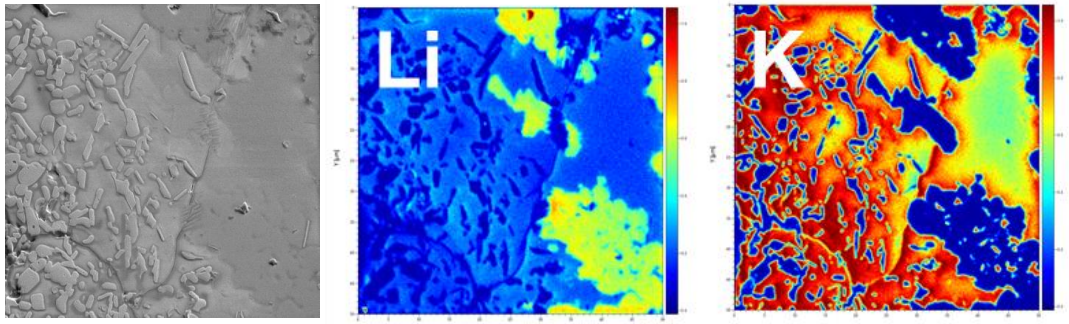


Mineralogy

- New mineralogical and geochemical database of WA Li-pegmatites established
- Alteration causes systematic loss of Li & increase in penalty elements (Fe, Mn and Na) in spodumene concentrates

Metallurgy

- Spodumene alteration affects beneficiation and recovery of concentrates
- **Melting of hydrous minerals in spodumene concentrates inhibit Li dissolution and generates glass clinker creating kiln maintenance issues and low Li yields**



Generation of K-rich melt during laboratory roasting of spodumene.
The melt creates two issues affecting plant operations: (1) Beta-spodumene has glass coating preventing Li extraction and (2) glass clinker clogs rotary kilns.

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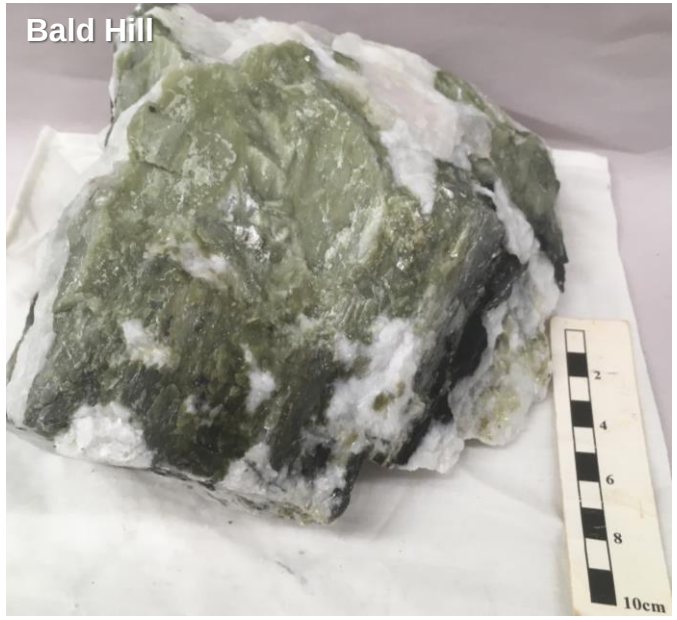
Another IMPACT of M532: sample collection for further research



FUTURE BATTERY INDUSTRIES CRC Project: TRUSTED SUPPLY CHAIN

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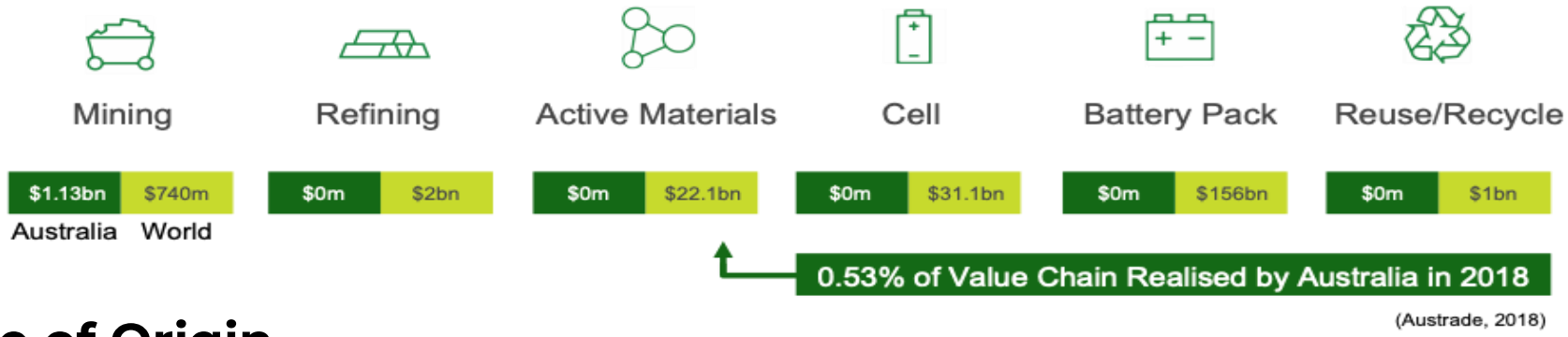
Murdoch Team: Hans Oskierski, Artur Deditius, Dilmi Wijewardhana, Aron Honra

Provenance Verification



Guarantee of Origin

A certification (Verified Credentials) or Independent Material Provenance Verification that validates the material in question based on Unique ID originated from a distinct geographic location or was generated by a specific process (eg. Utilised only renewable energy source).

Battery Minerals and Materials Provenance Verification depends on the understanding of Characteristic Intrinsic Properties, such as Chemical Data.

Geochemical Analytical Database of Critical Minerals is Fundamental! (Li Database of M532)

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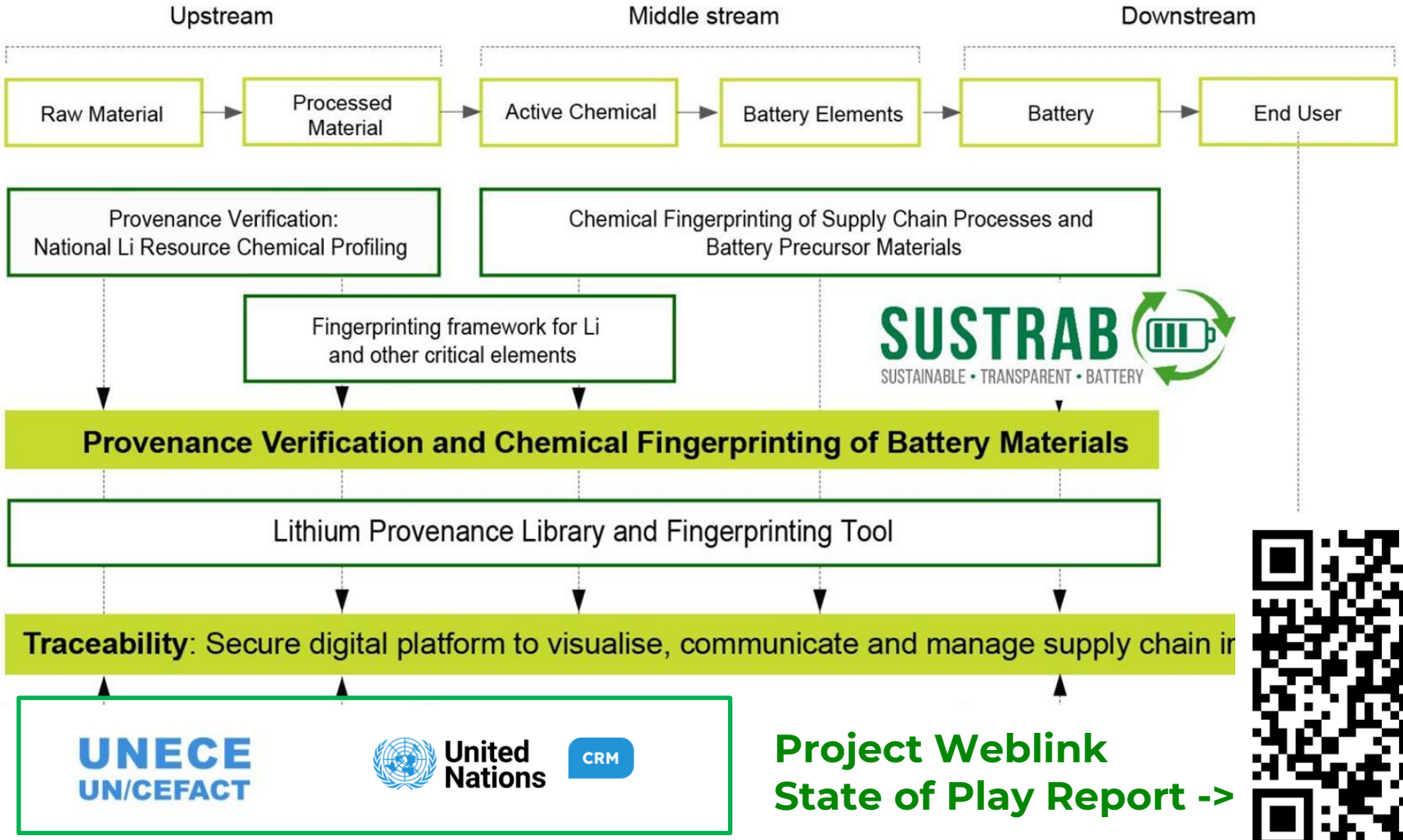
Trusted Supply Chain Project

To conclude in November, 2024



Project Weblink
State of Play Report ->

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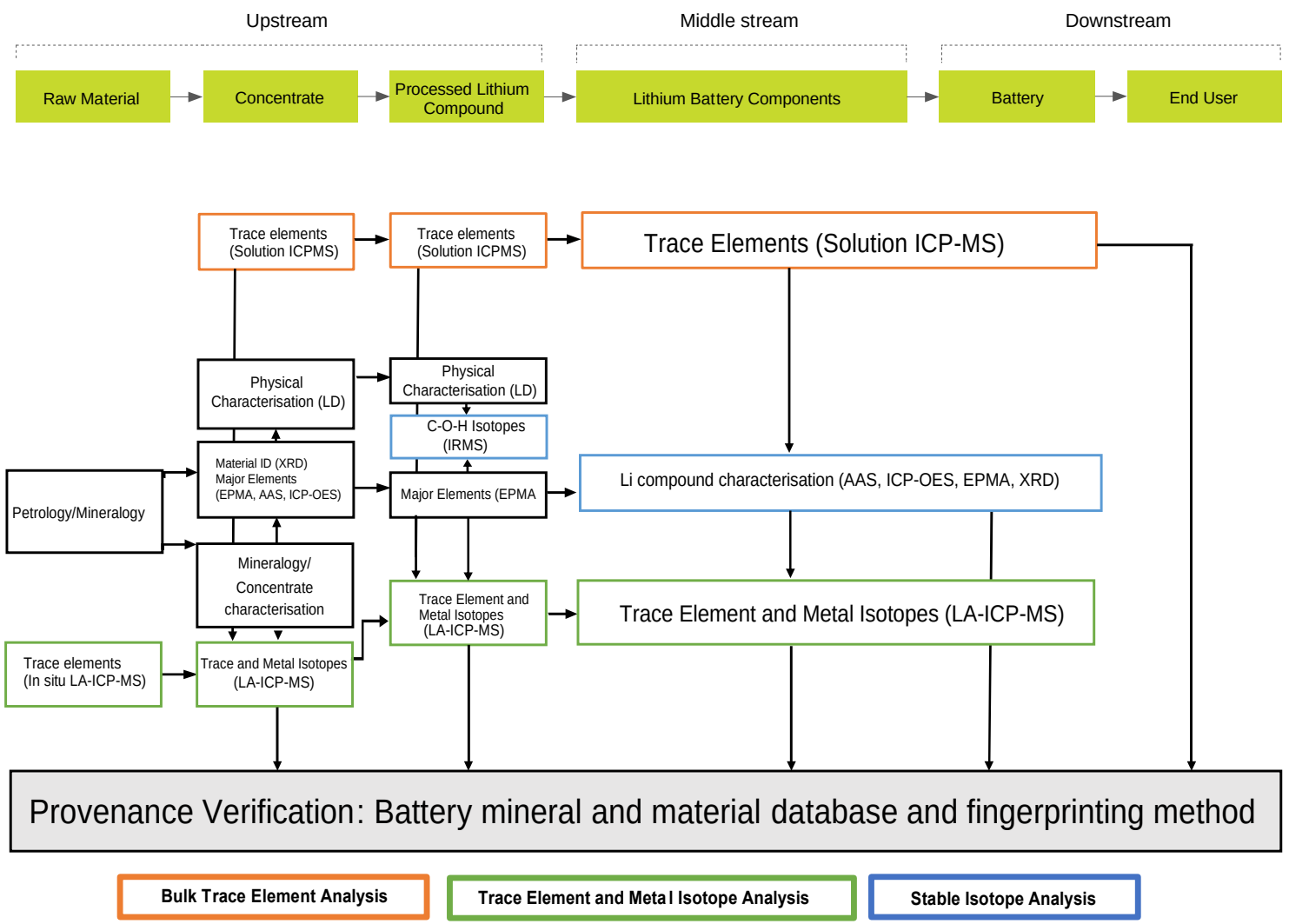
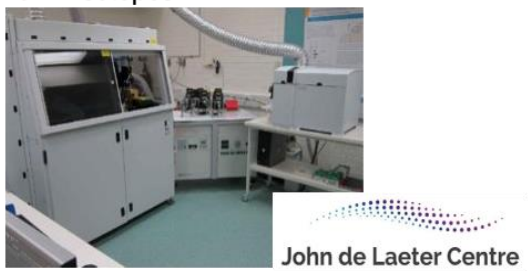
Provenance: Analytical workflow

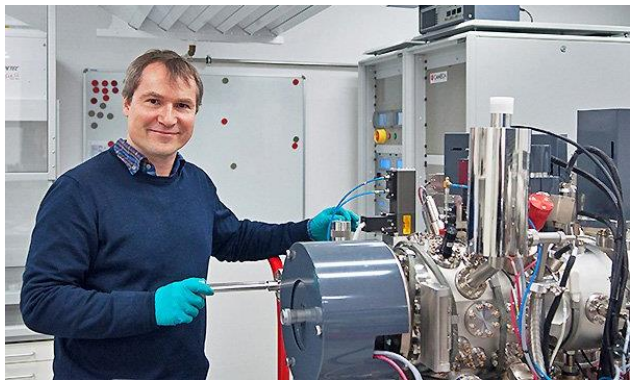


IRMS for C isotopes

Laser ablation Multicollector IPC-MS for Li isotopes



CAMECA SIMS for O Isotopes



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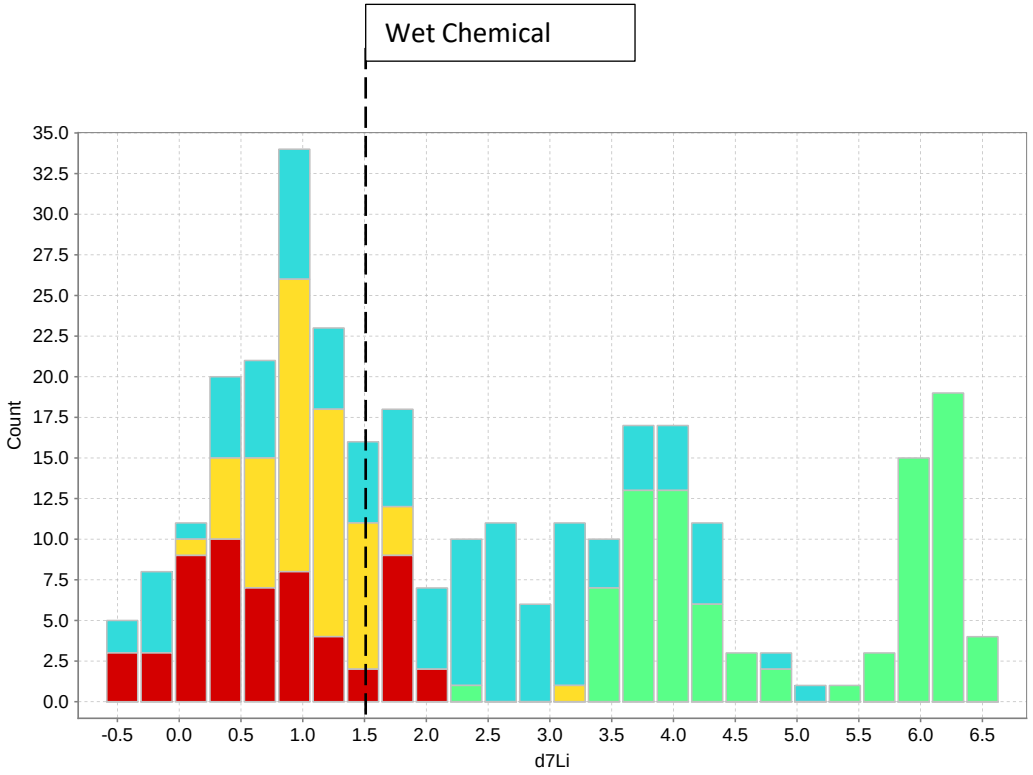
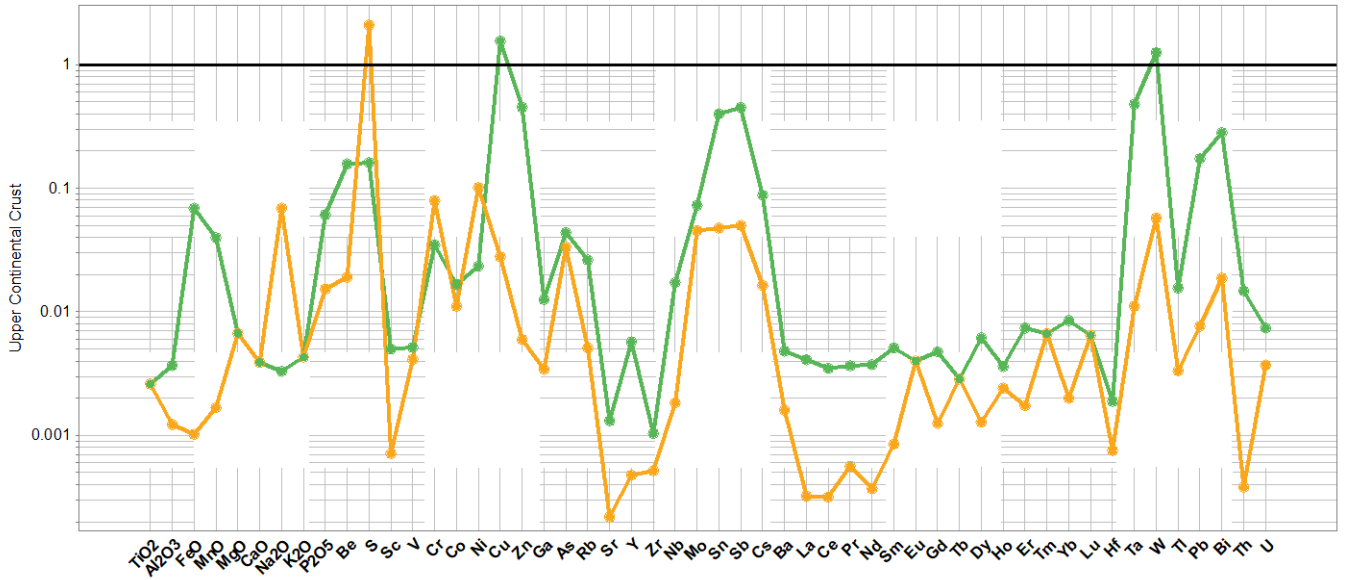
Li Material Analytical Findings



Wet Chemistry vs. In-Situ Analysis



LiOH (Hard Rock) vs. LiOH (Brine)

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Li Source Material Provenance

Note: Contact the authors for the presented data

Australian Li Raw Materials (Hard rock) plus relevant global sources

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Provenance Verification Value Proposition

CHEMICAL TRADEMARKING and CERTIFICATION

Company-level and Regional promise: Made in Australia!

Differentiate produced critical mineral with unique ID

GUARANTEE OF ORIGIN

Trust in Certification

CLAIMS VALIDATION

Responsible and Sustainable Materials

CIRCULARITY SUPPORT

Recycled Material Differentiation

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Guarantee of Origin: Approach

WHAT?

- Data Taxonomy
- Provenance Data Library
- Certification Scheme

UNECE UN/CEFACT

UN/CEFACT BRS Data Taxonomy Paper

WHO?

- Sensors/measurements
- Analytical Standards & Protocols
- Accreditations & trust

AuScope

Analytical Laboratory Partnership: Auscope

HOW?

- Digital Link Resolvers
- Unique Identifiers
- Verified Credentials
- Traceability Scheme

UNTP

UN Transparency Protocol

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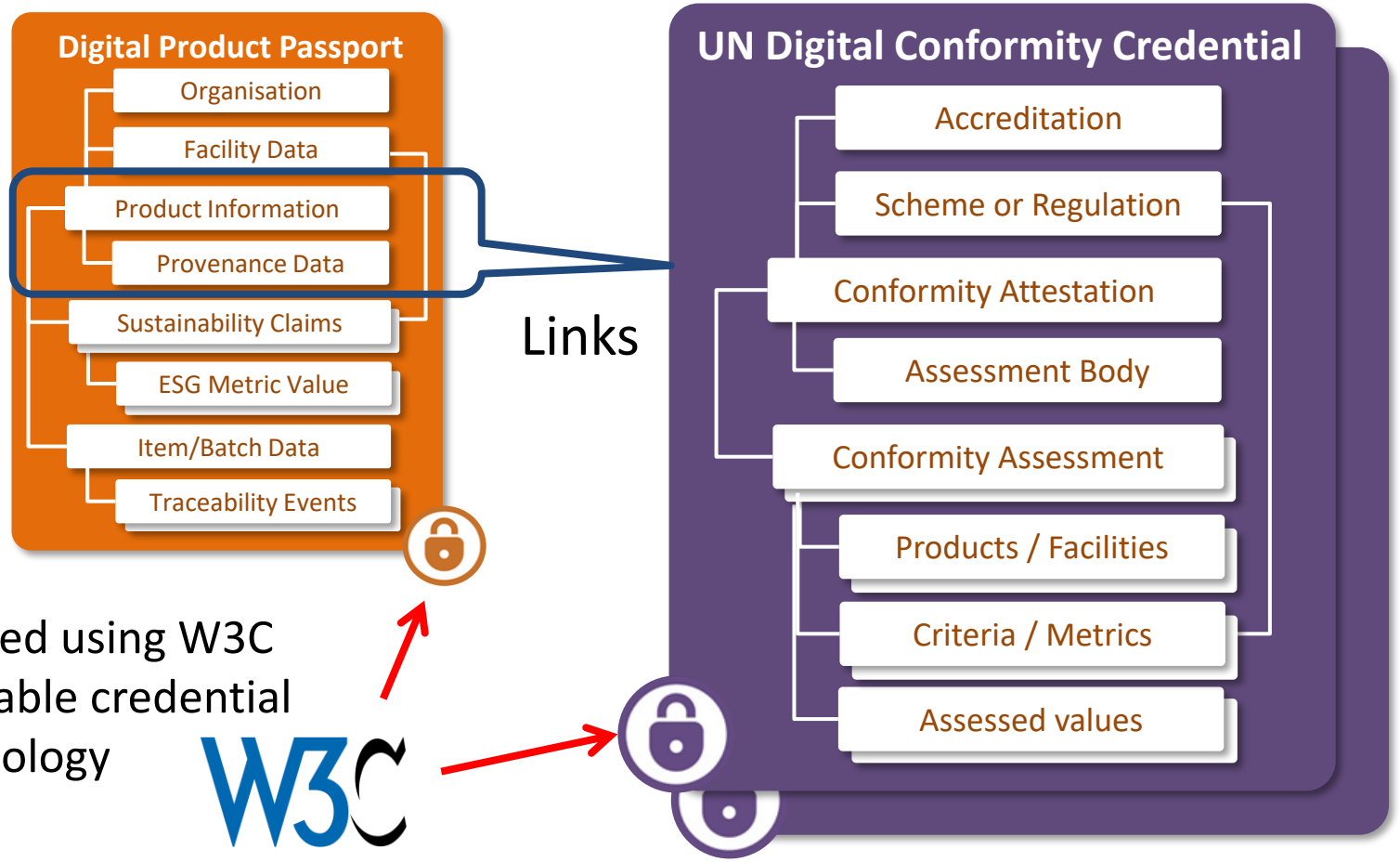
UNTP includes verifiable conformity evidence

Digital product conformity credential - developed in conjunction with national accreditation authorities and conformity assessment bodies.



Secured using W3C Verifiable credential technology

W3C

UNTP

Linked to passport and supports 2nd party, 3rd party, formal, & Material Provenance Verification

ILAC MRA aligned

ilac-MRA

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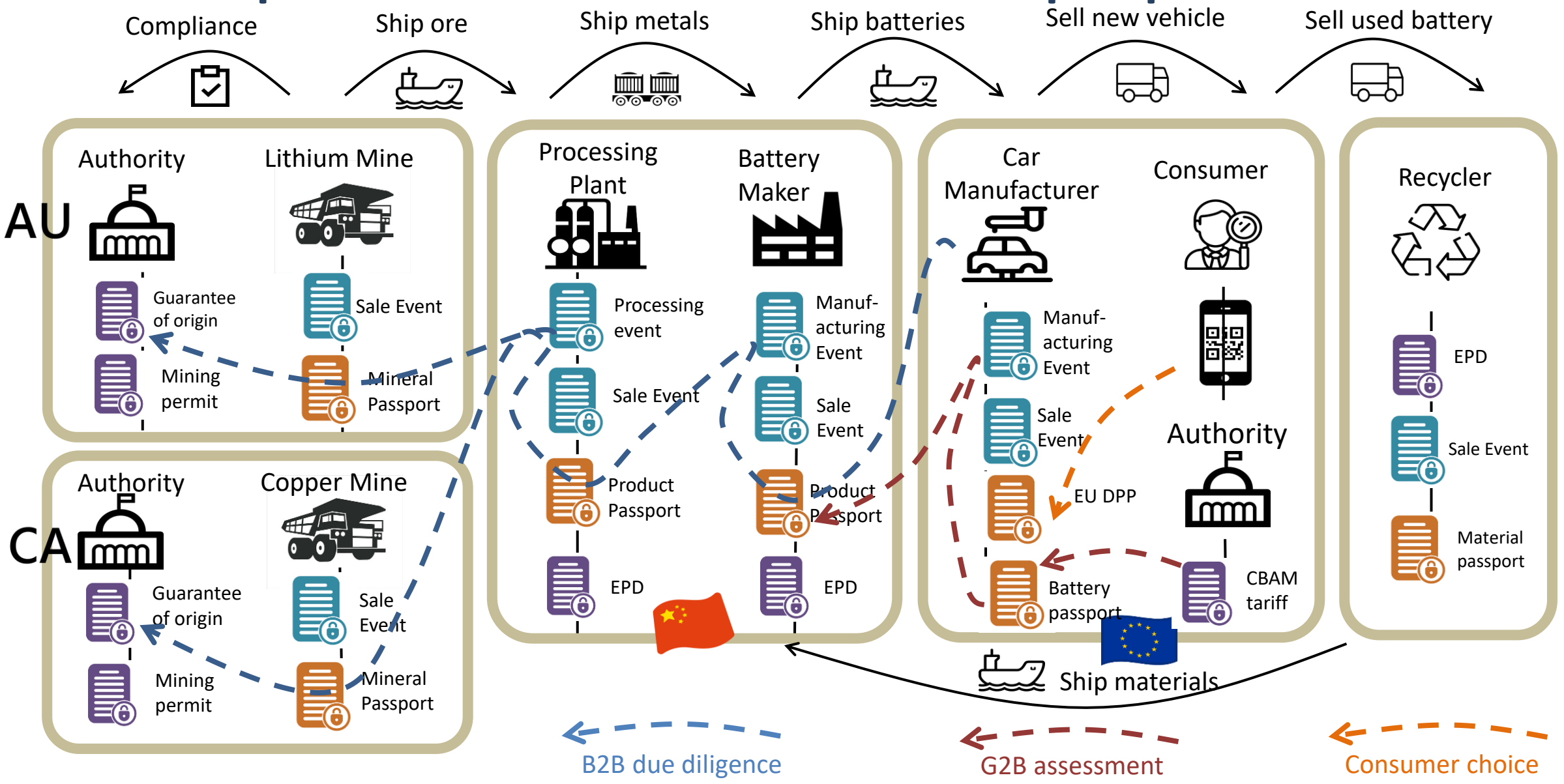
UNTP implementation – entire value chain perspective



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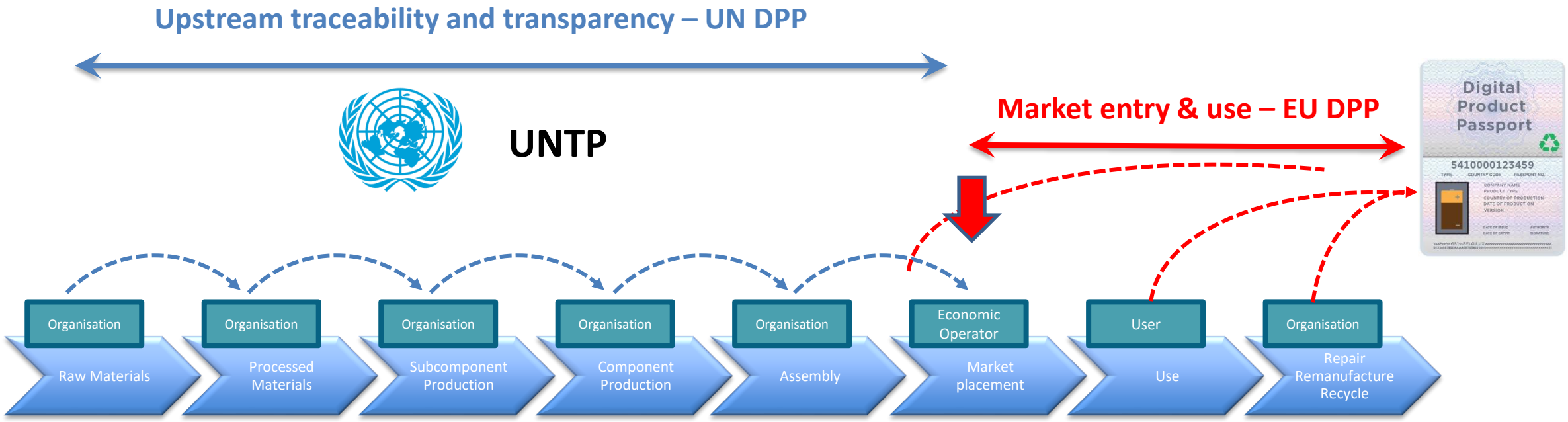
Every regulated market has cross-border supply

UNTP is complementary to regulatory product passports – it provides the high integrity **upstream data feedstock** to inform regulatory passports.



CIRPASS Digital Product Passport

Funded by the European Union

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What's Next for TSC Project: Provenance and Traceability

PROVENANCE VERIFICATION SERVICE FOR CRITICAL MINERAL SUPPLY CHAIN

Material Provenance Claim Validation
Verification Analytical Protocols and Industry Verification Standards

GUARANTEE OF ORIGIN and TRACEABILITY

Material Certification
UN Transparency Protocol and Digital Conformity Credential for Provenance Data

CHEMICAL TRADEMARKING OF PROCESSED MATERIALS

Company Specific Chemical Fingerprinting of Processes
Recycled Material Differentiation

Thank You

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