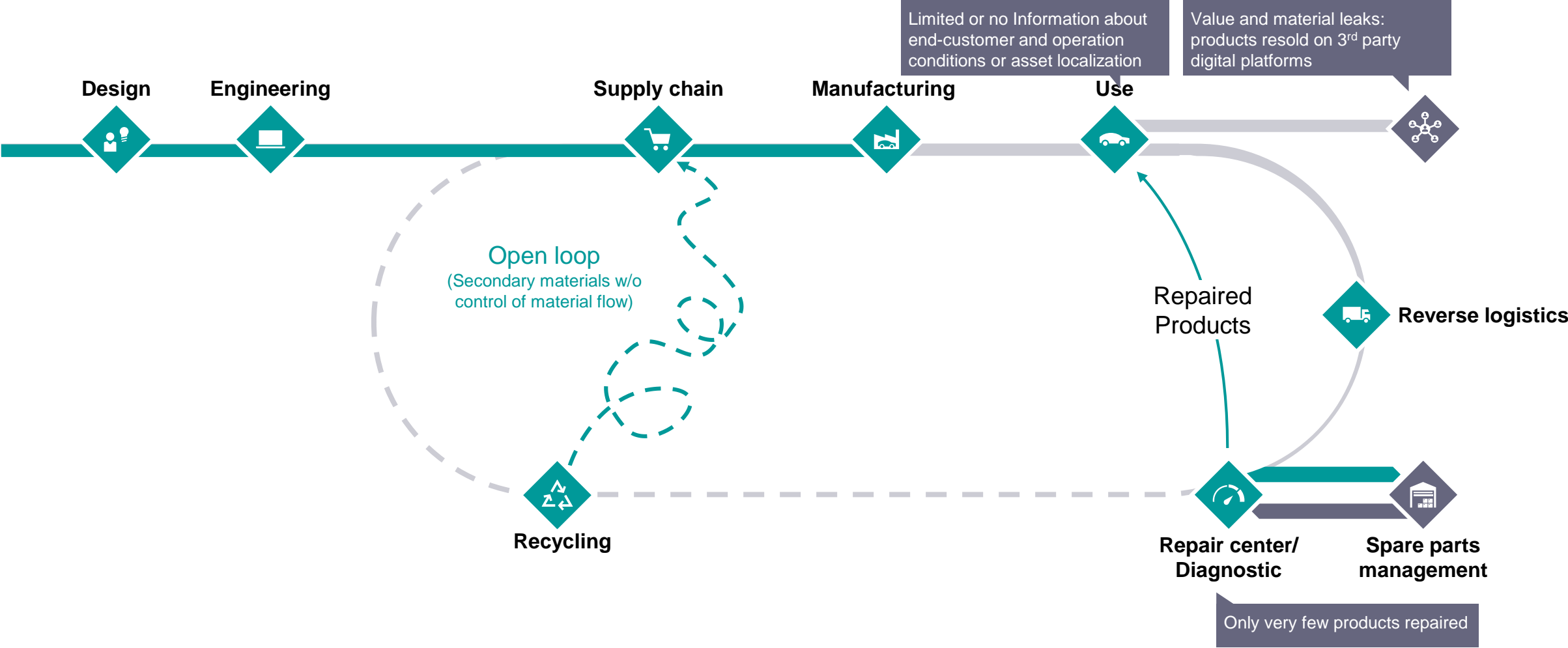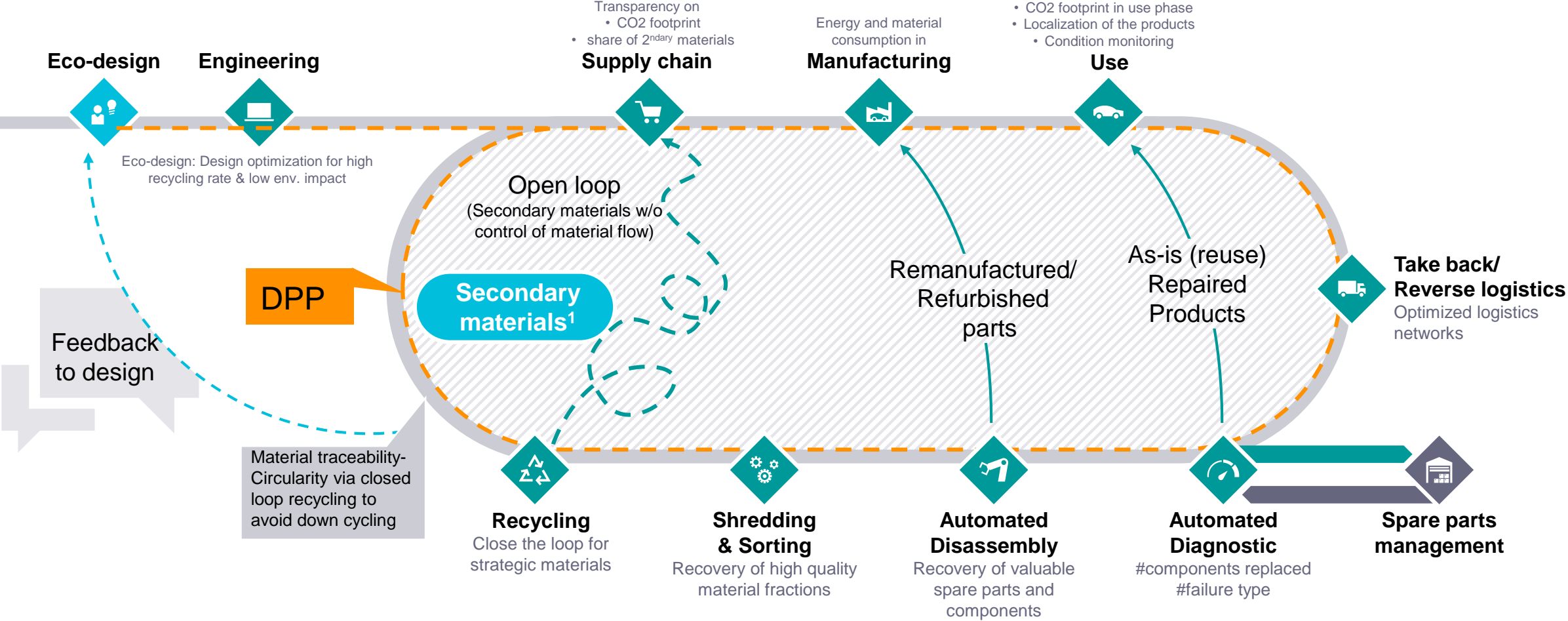greenict.connect23

Digital Product Passport: transparency on product and environmental data along the value chain

Dr. Caroline Cassignol

Principal Key Expert

Siemens Technology

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Today producers have little transparency on product and environmental impact beyond the manufacturing phase

Limited or no Information about end-customer and operation conditions or asset localization

Value and material leaks: products resold on 3rd party digital platforms

Design

Engineering

Supply chain

Manufacturing

Use

Open loop
(Secondary materials w/o control of material flow)

Repaired Products

Reverse logistics

Recycling

Repair center/ Diagnostic

Spare parts management

Only very few products repaired

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The digital product passport will provide transparency along the product life cycle. It is a key element to close the loop and foster circular economy
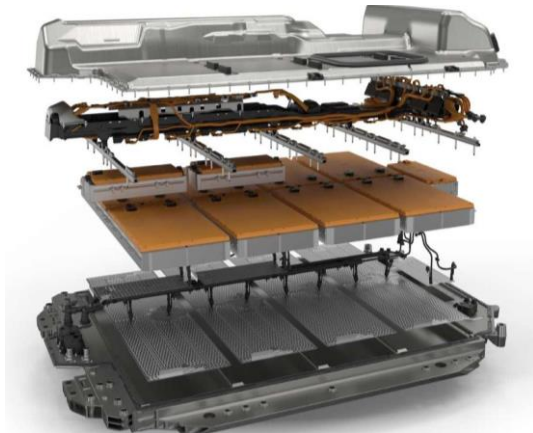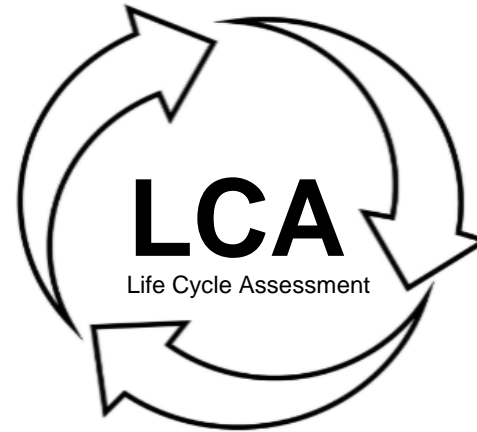
Transparency on
• CO_2 footprint
• share of 2ndary materials

Eco-design

Engineering

Supply chain

Energy and material consumption in
Manufacturing

• CO_2 footprint in use phase
• Localization of the products
• Condition monitoring
Use

Eco-design: Design optimization for high recycling rate & low env. impact

Open loop
(Secondary materials w/o control of material flow)

Feedback to design

DPP

Secondary materials[1]

Remanufactured/ Refurbished parts

As-is (reuse) Repaired Products

Take back/ Reverse logistics
Optimized logistics networks

Material traceability- Circularity via closed loop recycling to avoid down cycling

Recycling
Close the loop for strategic materials

Shredding & Sorting
Recovery of high quality material fractions

Automated Disassembly
Recovery of valuable spare parts and components

Automated Diagnostic
#components replaced #failure type

Spare parts management

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Digital Product Passport
Transparency, sustainability and automation through life cycle information

The DPP is a data set that transparently presents information about a product, such as the manufacturer, contained materials and chemical substances.

DPP is a key element of ESPR; blue print with Batteries. **Battery Passport to be implemented** until 2026.

LCA
Life Cycle Assessment

Transparent communication of sustainability KPIs over the life cycle enables improved environmental impact calculations.

7MF03..-.....-....

SITRANS P320 7MF03 / HNU
SITRANS P320 Pressure transmitter

Sales release · 01.08.18
Delivery release · 17.09.18
Announcement of product phase-out
Product cancellation
Product discontinuation

Digital nameplate

The **Digital Nameplate** serves as a replacement for analogue type plates and is an integral part of the DPP.

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Digital Product Passport 4.0
Definition and relationship to the real physical asset

Asset Administration Shell (AAS) (according to IEC63278) + **Digital Nameplate (according to IEC61406-1)** = **Digital Product Passport 4.0**

DPP 4.0

ZVEI Concept

AAS

dpp40.eu
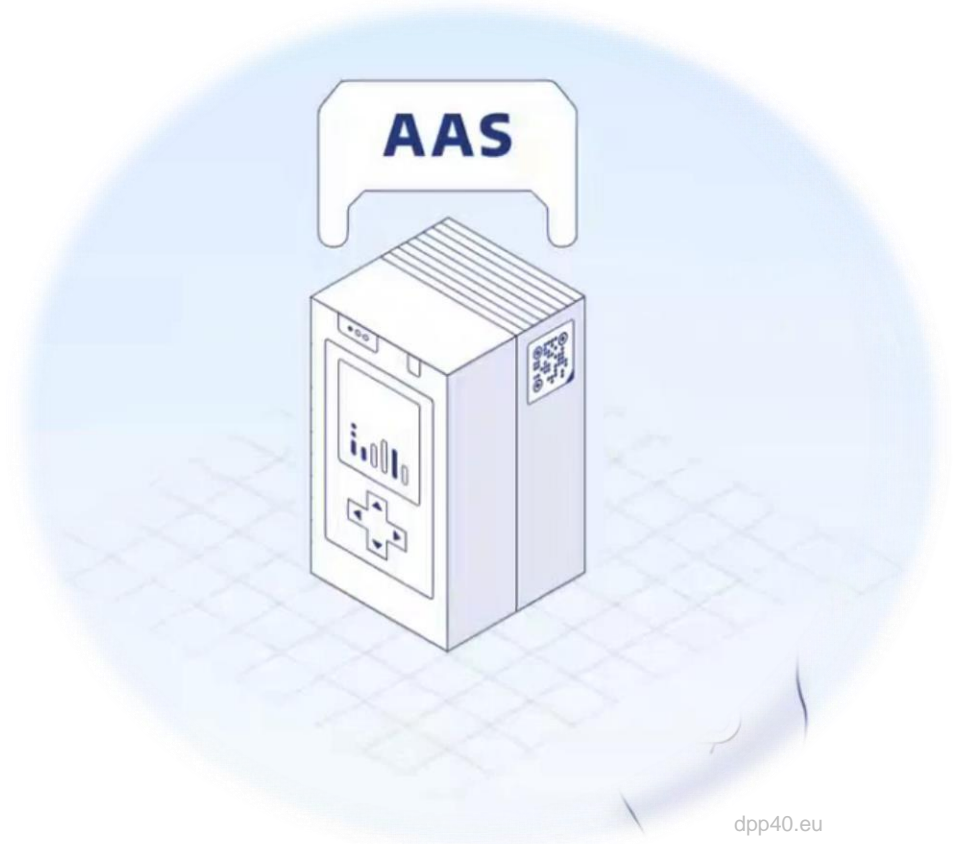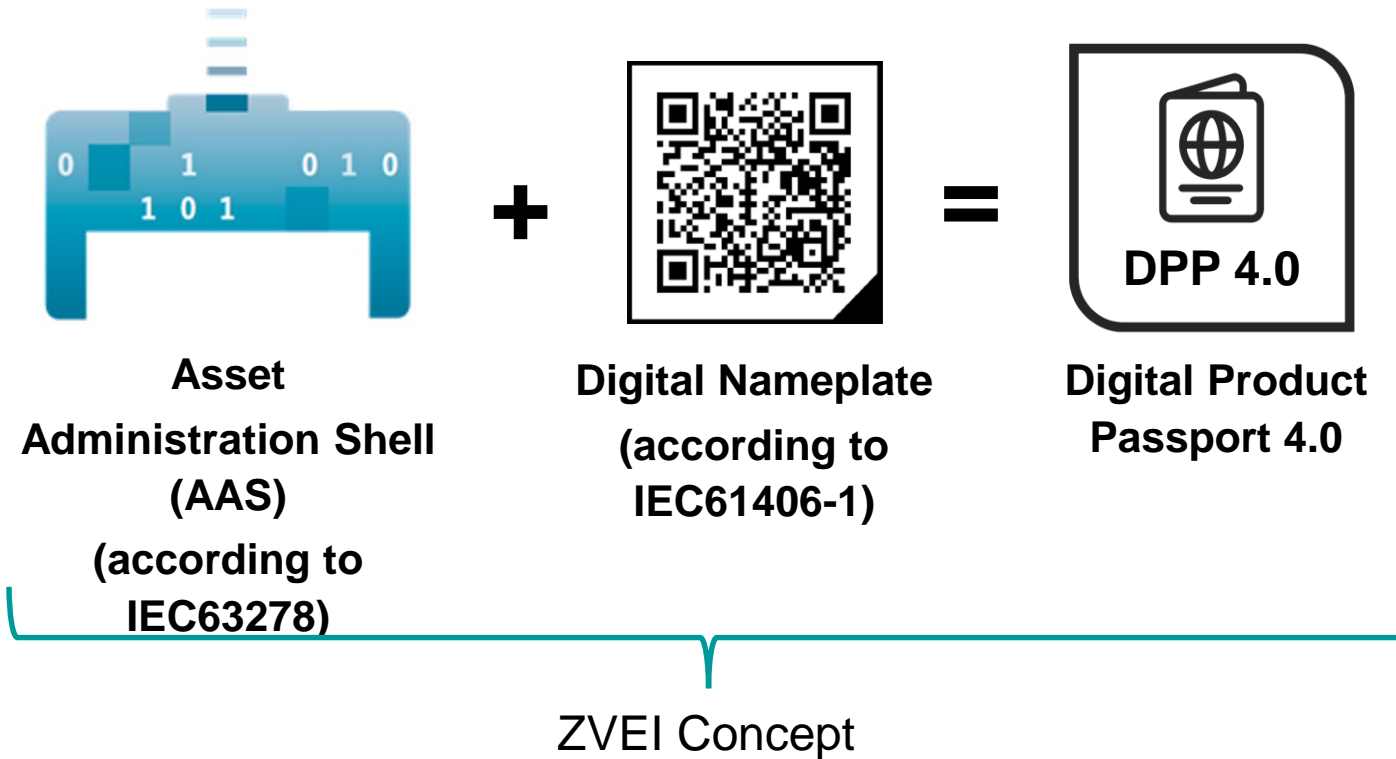
Source: D. Wegener et al., Panel discussion @HMI 2023 "DPP 4.0- The digital product passport for industry 4.0"

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AAS for the implementation of user-specific views on the data

AAS is a digital model that represents assets and a way to implement the Digital Twin in Industrie 4.0.

Asset Administration Shell

- Digital Nameplate
- Certificates
- Sustainability (PCF via SiGREEN)
- State of Health
- Other digital services
- Optimised Requirements elicitation Service

DNP 4.0 Digital Nameplate

Submodels including DPP information according to ESPR
• Public
• Restricted (Access based on Need-to-Know)

Submodels for any other Digital Service-
•Public
•Restricted (Access based on Business P...)

Public

Restricted

Digital Product Passport realised with the Asset Administration Shell
Real application example with Siemens S7 Controller

SiGREEN is connected to external partners as well as internal IT and OT infrastructure and will provide sustainability data for the DPP

Suppliers

Customers

ESTAINIUM
Network

Carbon Sinks

Certifiers

SiGREEN

- PCF management Solution as a Service
- Requesting, calculating and sharing trustworthy PCF data
- Convenient onboarding of suppliers via web frontend for standardized data input

Connect *Option*

Factory IT and OT integration for autom. data collection

On-premise *Option*

On-premise or private cloud deployment for independent hosting

Other Data Ecosystems

OT   IT

independent | pre-competitive | cross-industry   Leveraging Siemens' industry expertise

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The environmental product declaration (EPD) provides transparency on the environmental impact of the product and can be stored in an AAS submodel

LCIA Results

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Critical raw material act (03/2023) establishes the list of strategic material for Europe
Sharing data with recyclers should help to recover them and keep them in closed loop

unrestricted | © Siemens 2023 | Conference "Green ICT connect " | Dr. Caroline Cassignol

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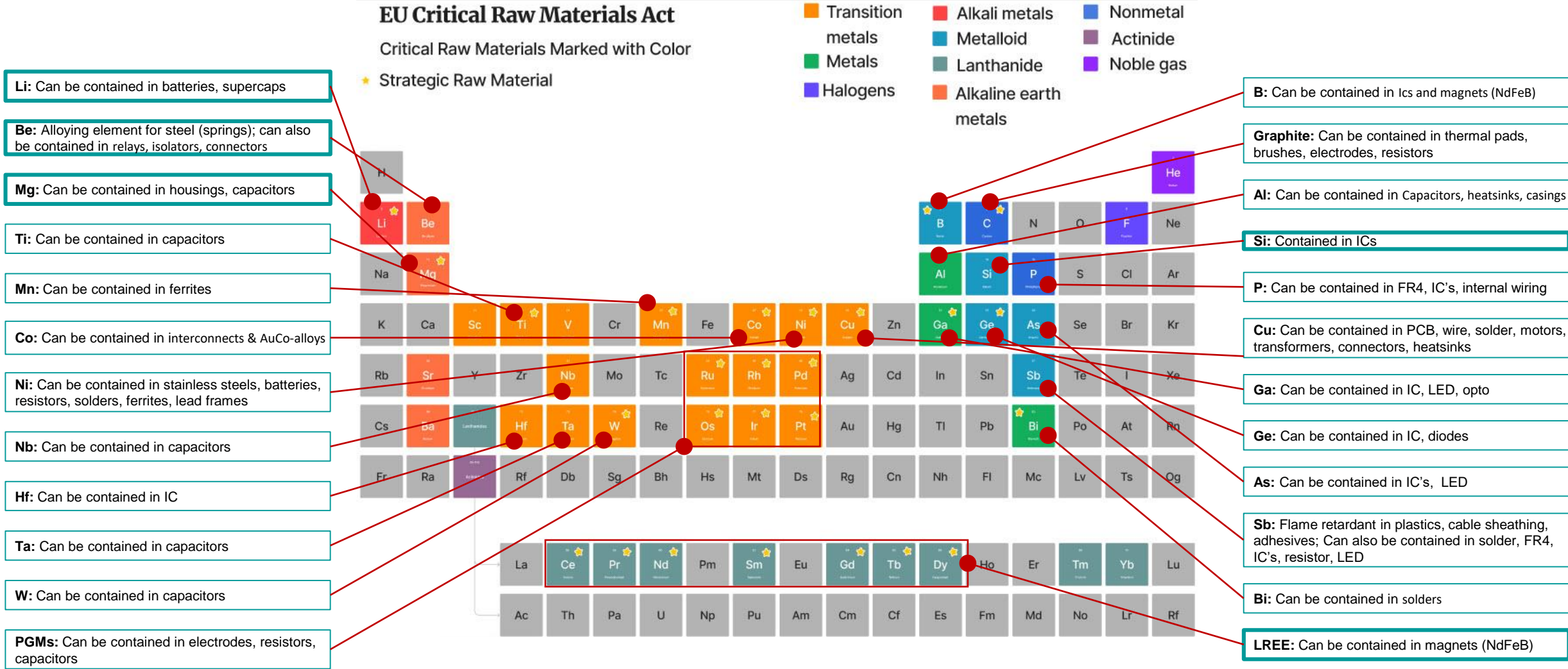
EU Taxonomy establishes further requirements to electronic equipments
Corresponding sustainability KPI can be shared among partners along the value chain

EUROPEAN COMMISSION

Brussels, XXX
C(2023) 3851 /2

ANNEX 2

ANNEX

to the

COMMISSION DELEGATED REGULATION (EU) …/…

supplementing Regulation (EU) 2020/852 of the European Parliament and of the Council by establishing the technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to the sustainable use and protection of water and marine resources, to the transition to a circular economy, to pollution prevention and control or to the protection and restoration of biodiversity and ecosystems and for determining whether that economic activity causes no significant harm to any of the other environmental objectives and amending Delegated Regulation (EU) 2021/2178 as regards specific public disclosures for those economic activities

- Information to customer
- Substitute Substances of Concern (SoC)
- Extended responsibility
- Durability / Longevity (Reliability, Upgradeability)
- Reuse /remanufacturing
- Ease dismantling
- Repairability
- Recyclability

+

ESPR

- Secondary Materials
- Energy efficiency
- ....

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The digital product passport is a key enabler of the twin green and digital transformation

DPP 4.0 will

➢ share primary data on products among partners across the value chain

➢ allow an accurate calculation of the environmental footprint based on this primary data

➢ Improve recovery of value products, (critical/strategic) materials and components through their localization and identification

➢ Provide real time information on performance and additional services like condition monitoring to improve environmental impact

➢ Enable a more accurate calculation of circularity metrics and key performance indicators at product and company level

➢ Support EU taxonomy and make environmental reporting easier

➢ help to achieve customer's trust
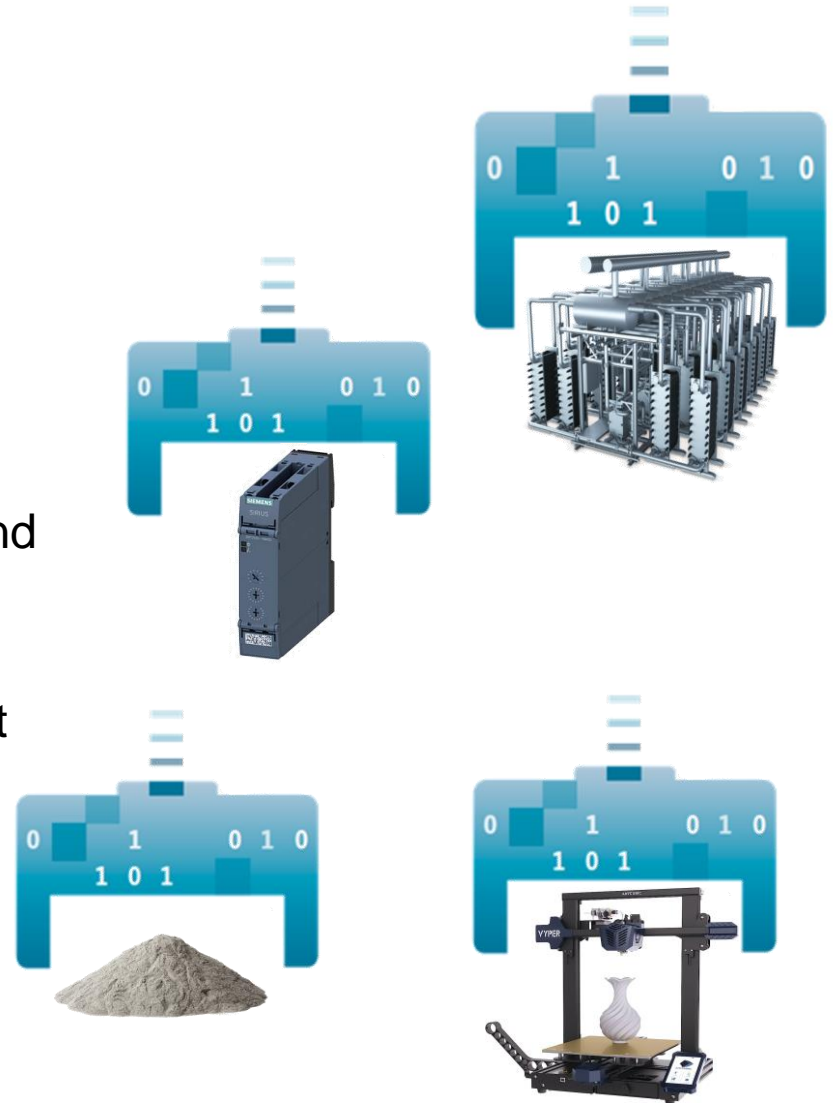
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