INNOVATION: DIGITALER PRODUKTPASS – Innovationsmöglichkeiten durch den DPP

Stakeholderbeteiligungs-Workshop

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Green Business Disruption Summit, 2025-04-01

PACE-DPP
Digital Product Passport

Funded by
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Climate Action, Environment,
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FFG
Promoting Innovation.

DLR Projektträger

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for Economic Affairs
and Climate Action
on the basis of a decision
by the German Bundestag

Contact us!

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Workshop
INNOVATION & DIGITALER PRODUKTPASS

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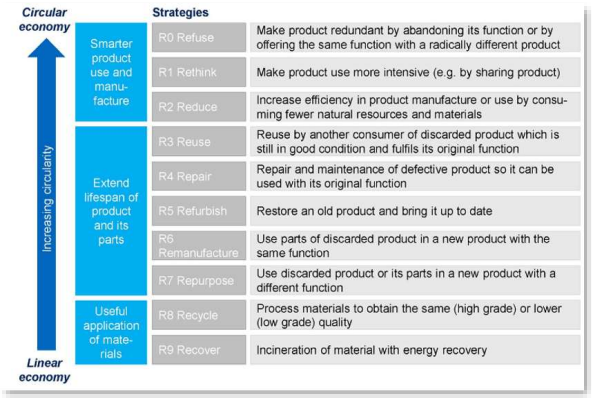
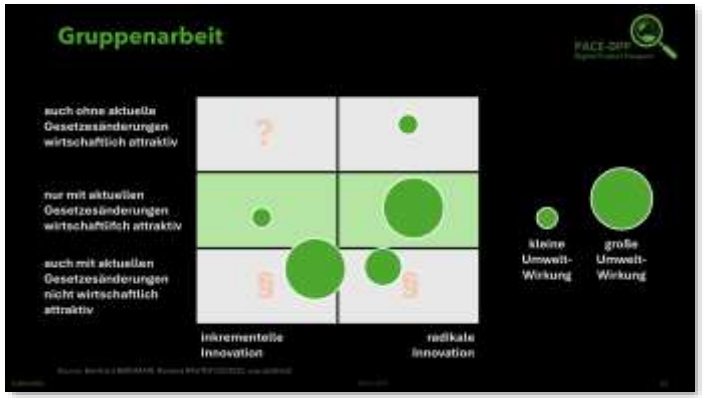
Runde 1

- **Intro**: Kreislaufwirtschaft & EU Ökodesign-Verordnung
- **10 R-Strategien** der Kreislaufwirtschaft + Blick in die Zukunft
- Interaktion:
  - **Zirkuläre Geschäftsmodelle?**

Runde 2

- Daten im **Battery Passport** = „Blick in die Zukunft“?
- Interaktion:
  - **Zirkuläre Geschäftsmodelle?**
  - **Datengrundlage im DPP?**





FFG-Leitprojekt PACE-DPP 2025-2027

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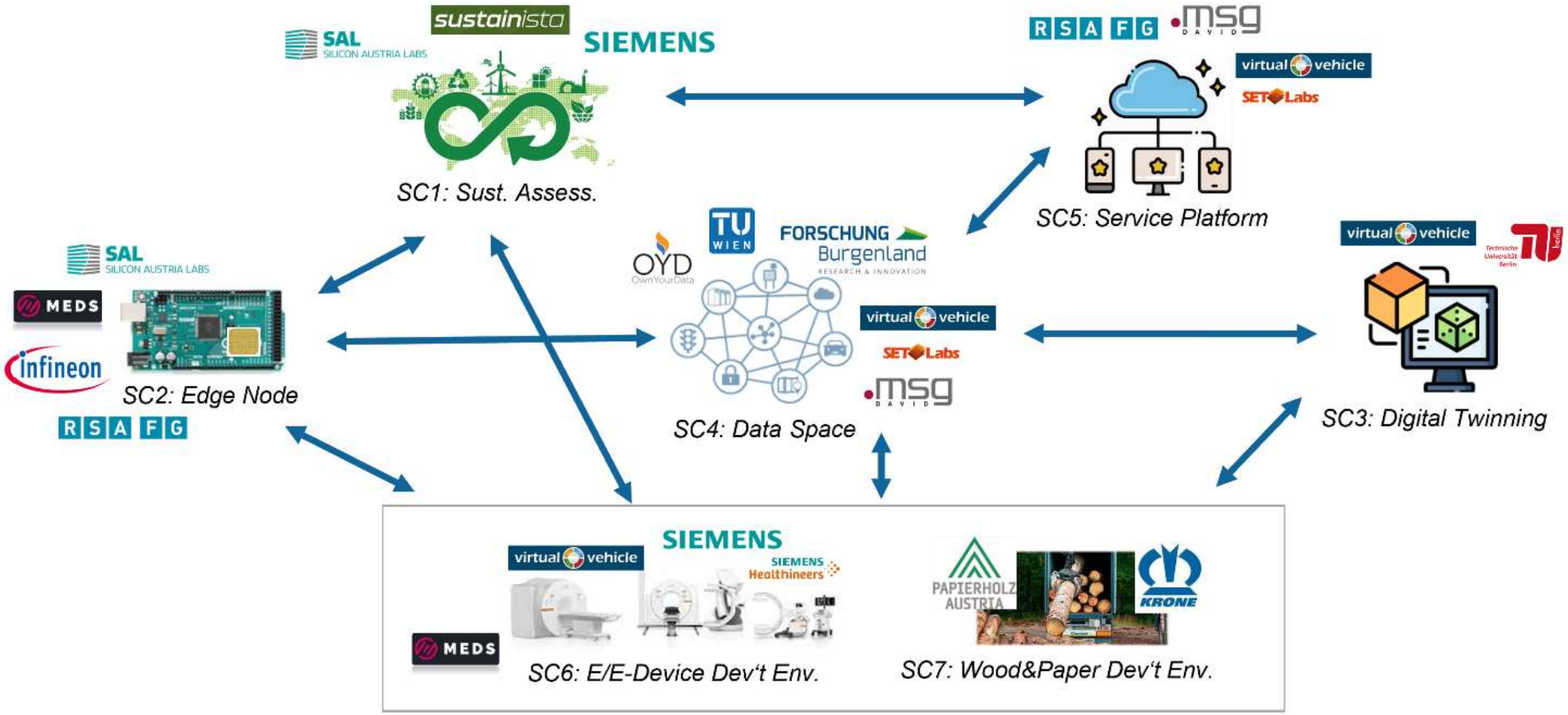

Disclaimer

- Die Ergebnisse des Workshops fließen in das **FFG Leitprojekt PACE-DPP** ein.
- Ziel: Verbreitung der Kreislaufwirtschaft
- Die Ergebnisse werden ggf. auch veröffentlicht – aber ausschließlich anonymisiert.

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Intro: Kreislaufwirtschaft & Ökodesign-Verordnung

Umweltauswirkungen von Elektronik

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Raw Materials
- Mineralien-Bedarf

Manufacturing
- Giftige Prozess-Chemikalien
- Energie-Bedarf

Use
- Energie-Bedarf

End of Life
- Elektroschrott teilweise giftig
- global 88% unsachgemäß entsorgt

- Kurzlebigkeit
- Rebound-Effekte

Source: https://commons.wikimedia.org/wiki/File:Chemetall_Foote_Lithium_Operation.jpg , https://commons.wikimedia.org/wiki/File:Nuclear_Power_Plant_Cattenom.jpg , https://commons.wikimedia.org/wiki/File:Electronic_waste_at_Agbogbloshie,_Ghana.jpg , https://ewastemonitor.info/wp-content/uploads/2024/03/GEM_2024_18-03_web_page_per_page_web.pdf

Geld verdienen mit nachhaltigen Lösungen!

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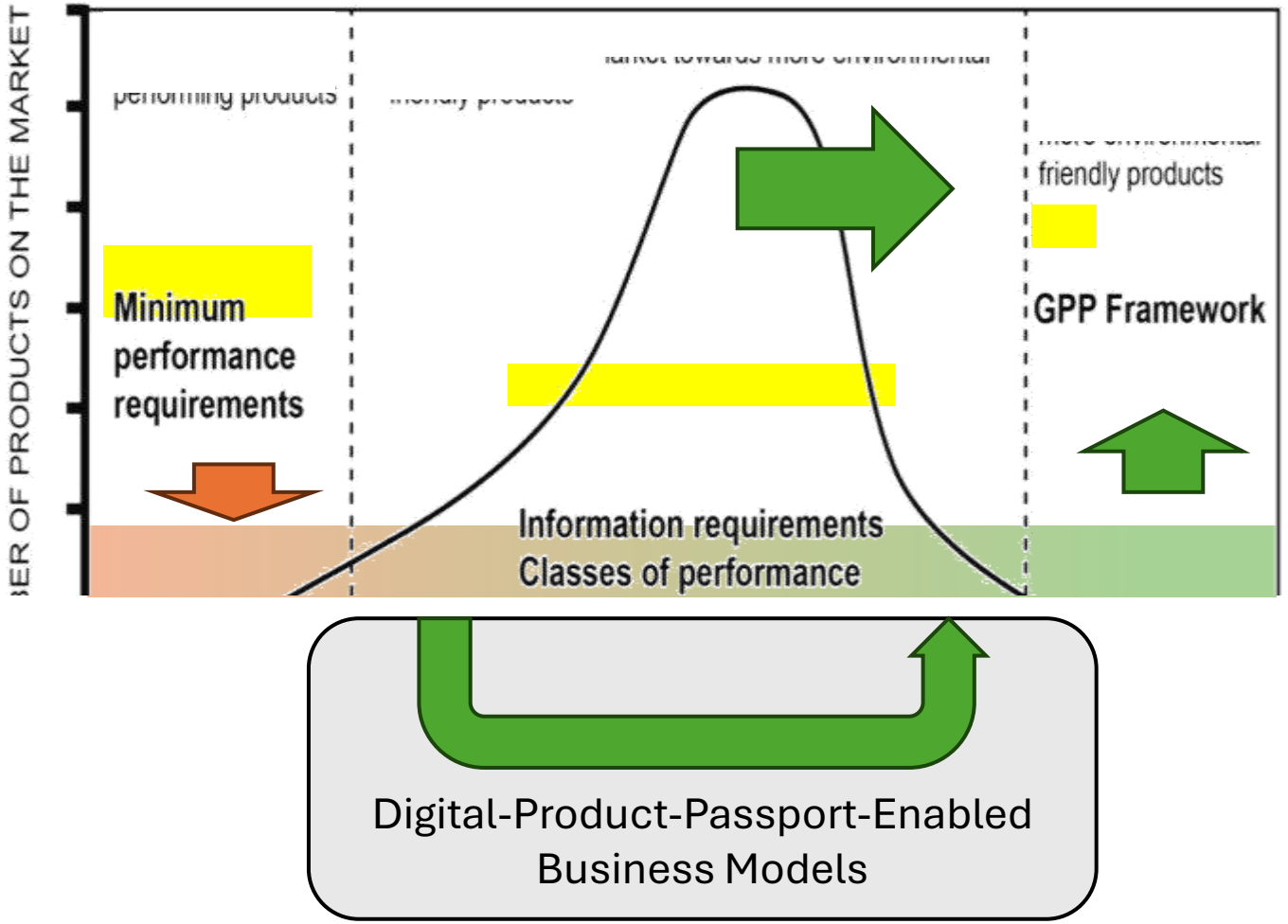
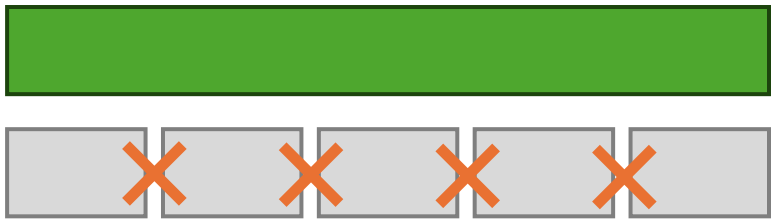
EU Ökodesign-Verordnung: Performance vs. Information Requirement



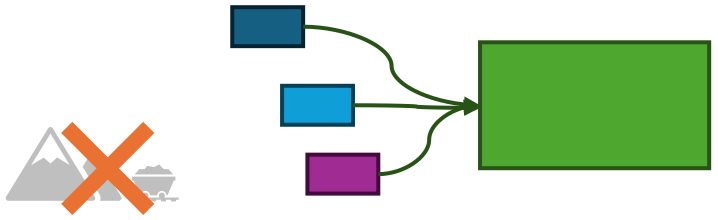
Source: based on https://www.nordic-pef.org/wp-content/uploads/2023/11/Discussion-paper-performance-levels.pdf

Denkmöglichkeiten

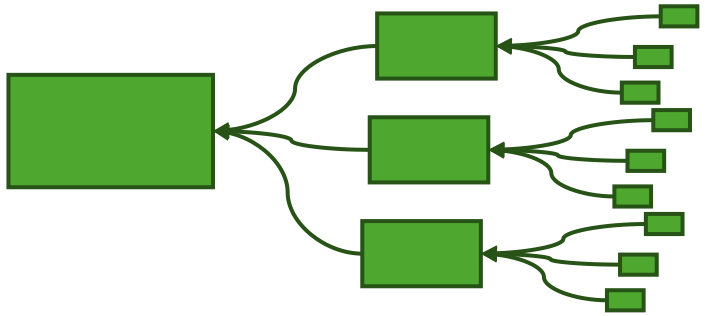
- Ewige Produkte



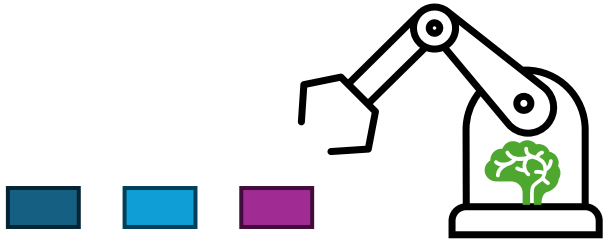
- Nur gebrauchte Komponenten



- Mass-Disassembly & Reverse Logistics



- Losgröße 1 – Reparatur- und Zerlege-Roboter



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10-R-Strategien & Mögliche Innovationen

10R Framework

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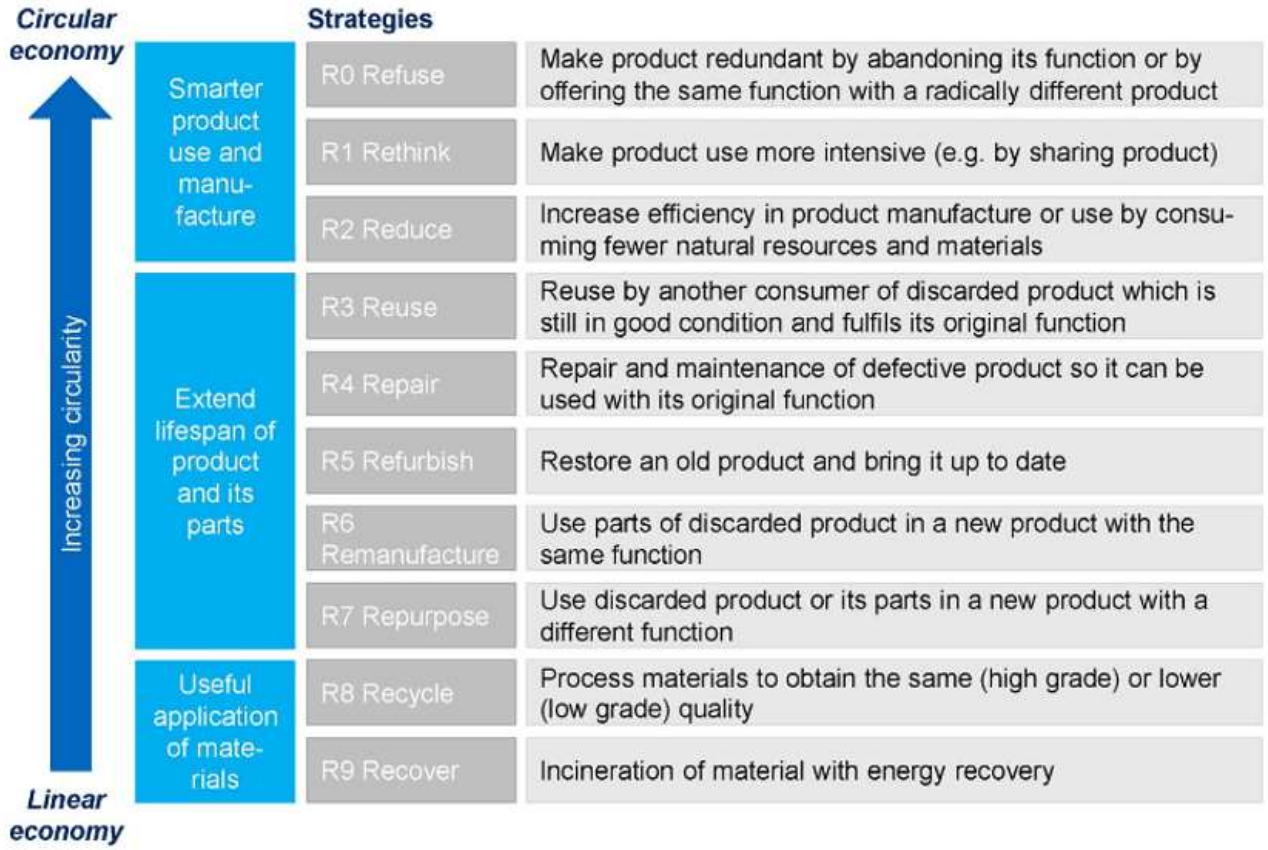
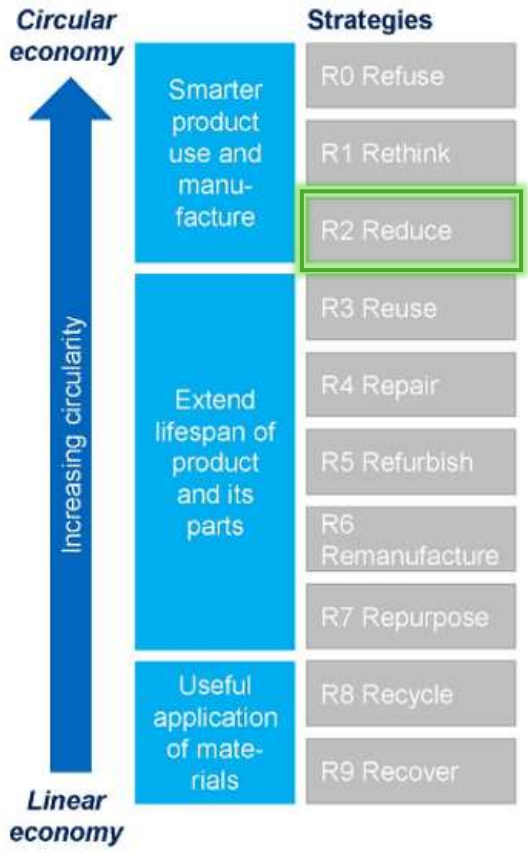


Source: Kirchherr, Julian and Reike, Denise and Hekkert, Marko, Conceptualizing the Circular Economy: An Analysis of 114 Definitions (September 15, 2017). Available at SSRN: https://ssrn.com/abstract=3037579 or http://dx.doi.org/10.2139/ssrn.3037579

10R Framework



Garantierte Lebensdauer

DPP enthält:
Betriebsstundenzähler,
garantierte Restlebensdauer,
Garantiegeber.

Source: https://de.wikipedia.org/wiki/LED-Leuchtfaden

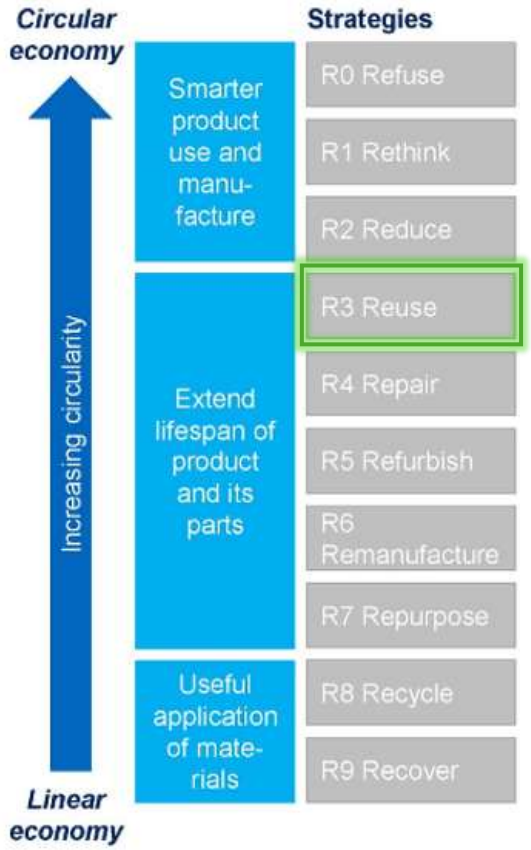
DPP-Geizhals mit TCO*-Minimierer

** Total Cost of Ownership*

Source: https://geizhals.at

ABER: Wer trägt Kosten für Umweltbelastungen?

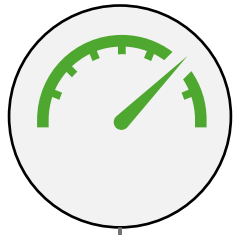
10R Framework



State-of-Health (SoH)-Information im DPP

z.B. Elektroauto-Batterie.

Die SoH-Information senkt das Käufer-Risiko.



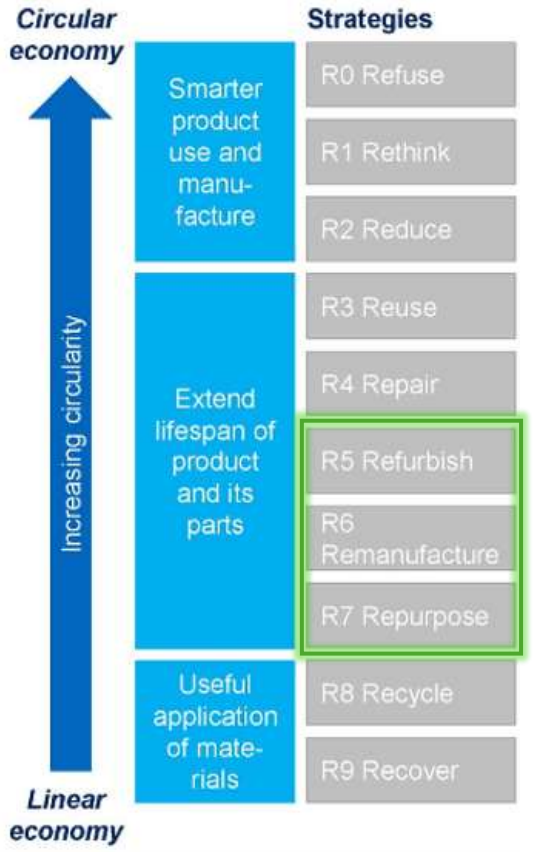
Garantien im DPP

Betriebstemperatur eingehalten?
Wartungsintervalle eingehalten?
... signiert von Wartungsbetrieb.

Garantierte Restlebensdauer.

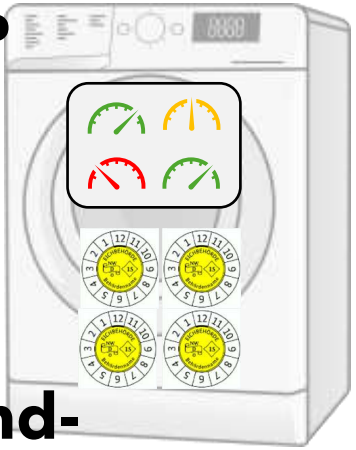
Source: https://pixabay.com/de/illustrations/wagen-elektroauto-ladestation-6943451/

10R Framework



State-of-Health-Information im DPP

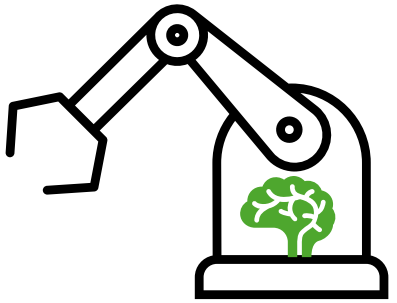
Selbst-Diagnose auf Bauteil-Ebene.
Garantien auf Bauteil-Ebene.
Regeln für System-Garantie.



Automatisierte Zerlegung von Fremd-Produkten („Disassembly CNC")

DPP enthält Stücklisten, 3D-Daten, standardisierte Zerlege-Anweisung.

Source: https://www.youtube.com/watch?v=9CwRAaqqMrc



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Circular Business Model Framework (nach E. Hansen & acatech)

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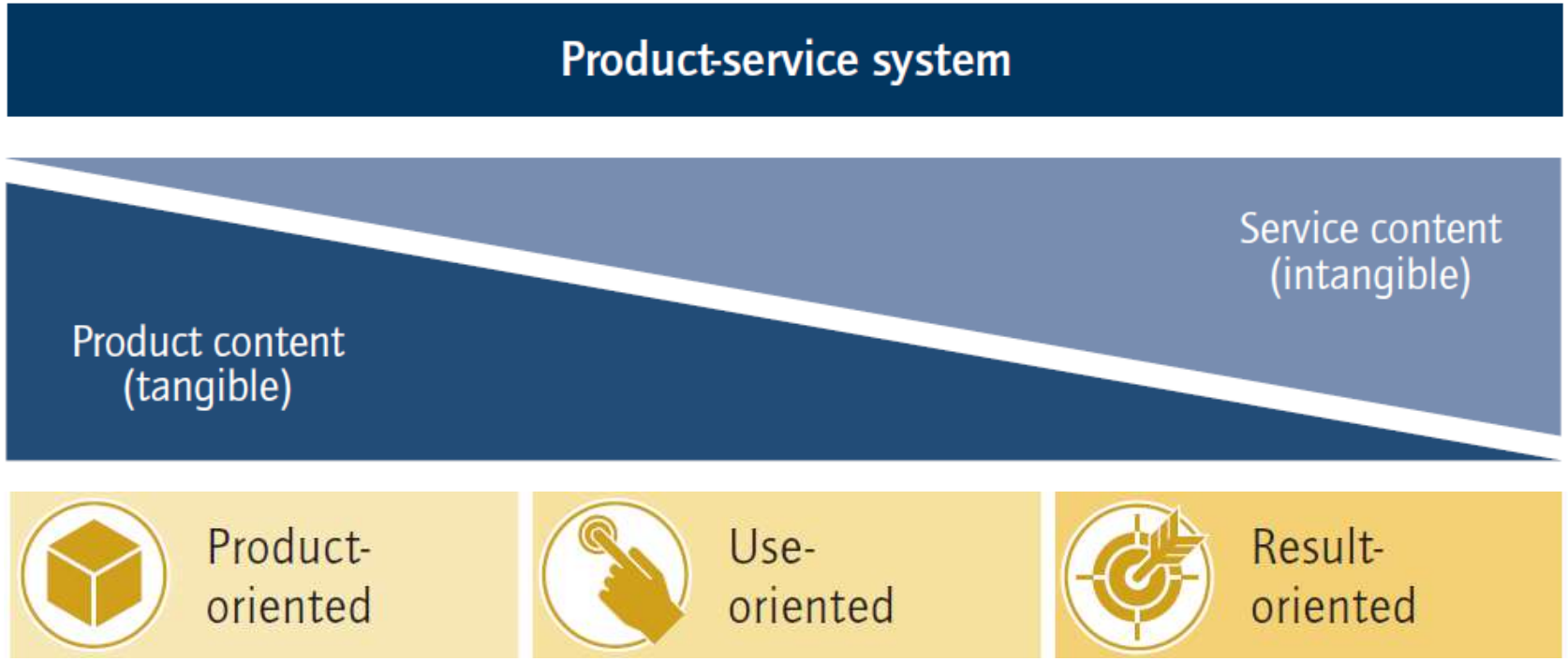

Source: Hansen, E., et al. – acatech – Circular Economy Initiative Deutschland (Ed.): Circular Business Models: Overcoming Barriers, Unleashing Potentials (2020), https://www.circular-economy-initiative.de/circular-business-models-overcoming-barriers-unleashing-potentials

Circular Business Model Framework (nach E. Hansen & acatech)

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Actor's main role	Circular strategy	Id	Business model pattern	Service Level (sub-pattern)		
				Product-oriented	Use-oriented	Result-oriented
Supplier (molecules/ materials)		A1	Circular raw materials supplier	Molecule & material recycling	Materials bank	-
		A2	Process molecule service provider	-	Molecule & material leasing	Molecule & material performance
Supplier (mechanical engineering)		B1	Machines/components 'as new'	Machines/components 'as new'	Rental machines/ components 'as new'	Pay per reman machine performance
		B2	Machine/component remarketing	Used machines/ component sales	Rental machines/ components	→ see B1 Pay per reman machine performance
Producer		C1	Proprietary material cycles	Waste cherry picking	Materials bank partnership	-
		C2	Product 'as new'	Selling Products 'as new'	Product leasing 'as new'	→ see C6 Total care producer
		C3	Used product remarketing	Used product sale	-	-
		C4	Out-of-warranty repair service	On-demand repair	→ see C6 'Leasing producer'	→ see C6 Total care producer
		C5	Upgrades, spares & accessories	Modules & accessories shop	Upgrade subscription	-
		C6	Maximising product uptime	Fee-based maintenance	Leasing producer	Total care producer
Retailer & service points		D1	Retailer as cycle manager	Retailer as cycle manager	→ see C1 Materials bank partnership	-
		D2	Retail remarketing & reman	Used goods on sale	Rent-a-wreck fleet manager	-
		D3	One-stop shop (retail)	Integrated service point	Rental retail	Total care retail

Actor's main role	Circular strategy	Id	Business model pattern	Service Level (sub-pattern)		
				Product-oriented	Use-oriented	Result-oriented
Repair provider		E1	Repair gap exploiter	Repair transaction	Repair-based rental	-
Prosumer		F1	Prosumer support system	Do-it-yourself repair	Peer-to-peer sharing	-
Logistics provider		G1	Material reverse logistics	-	-	Pay per recycling logistics performance
		G2	Refurb logistics services	-	-	Pay per refurb performance
		G3	Spare parts management	-	-	Pay per spare part performance
Recovery manager		H1	Revitalised products	Used goods bargain	-	-
		H2	Coordinator of informal collection	Fair-trade recyclates	-	-
Intermediary		I1	Recycling platform	Recycling platform	-	-
		I2	Used goods & sharing platform	Used good platform	Sharing platform	-
Emerging actors	All	J1_x	?	?	?	?

Source: Hansen, E., et al. – acatech – Circular Economy Initiative Deutschland (Ed.): Circular Business Models: Overcoming Barriers, Unleashing Potentials (2020), https://www.circular-economy-initiative.de/circular-business-models-overcoming-barriers-unleashing-potentials

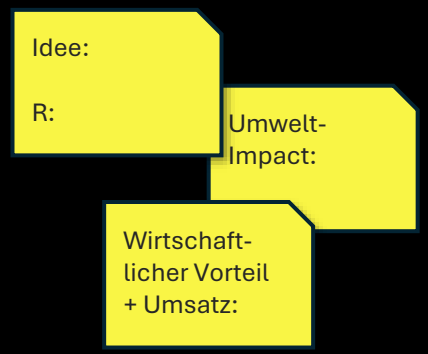
Gruppenarbeit:
Unsere Innovations-Ideen?

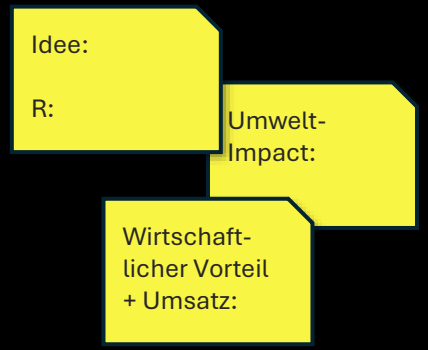
Gruppenarbeit I

Aufteilung nach Branchen

Unsere Innovations-Idee

- Ich beziehe mich auf dieses R: _____
- Welches Umweltproblem löst es?
- Welches wirtschaftliche Problem löst es?
- Wie sind Umsätze generierbar?
- Würde die Innovation auch ohne Regularien erfolgreich sein können?
- Naheliegende inkrementelle Innovation vs. Radikale Innovation?



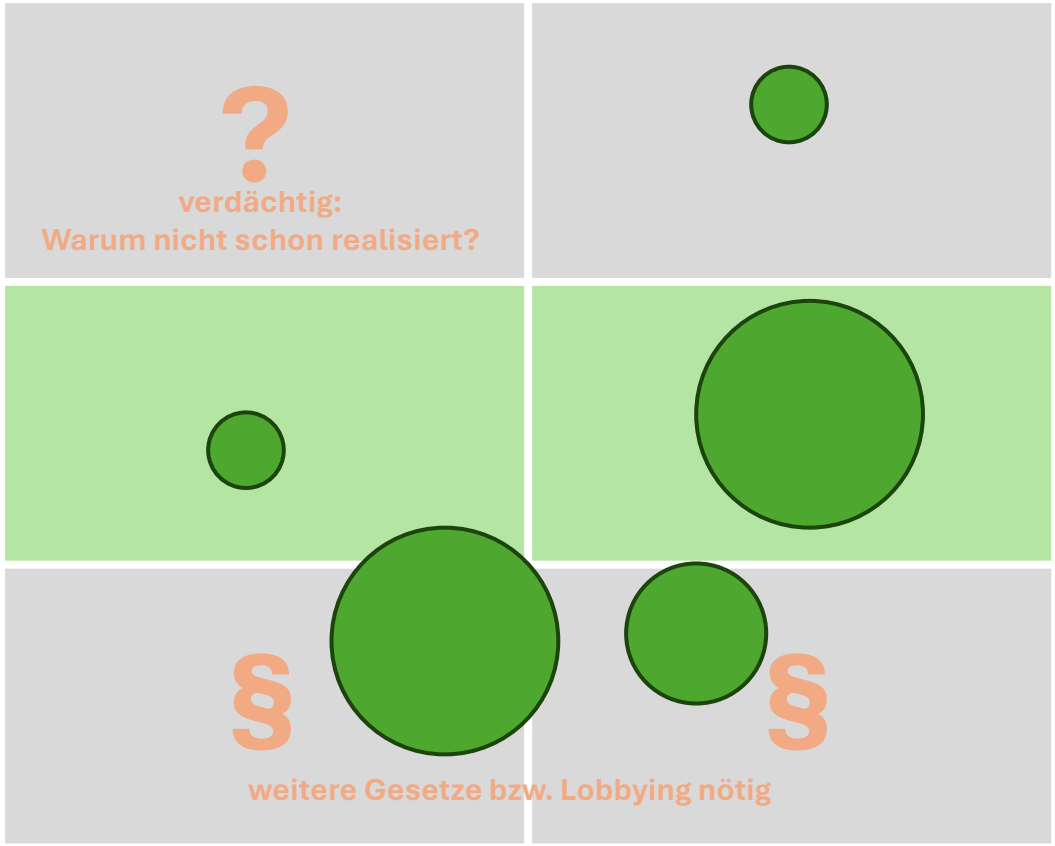


Innovations-Regularien-Portfolio

auch ohne aktuelle Gesetzesänderungen wirtschaftlich attraktiv

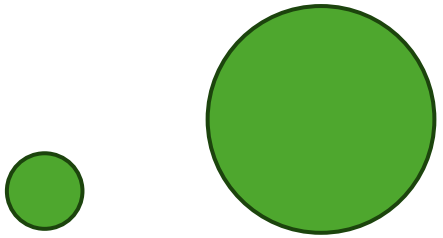
nur mit aktuellen Gesetzesänderungen wirtschaftlich attraktiv

auch mit aktuellen Gesetzesänderungen nicht wirtschaftlich attraktiv



inkrementelle Innovation

radikale Innovation



kleine Umwelt-Wirkung

große Umwelt-Wirkung

Source: Bernhard BERGMAIR, Romana RAUTER (02/2025, unpublished)

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DPP – Mögliche Datenfelder

Battery Passport Use Cases

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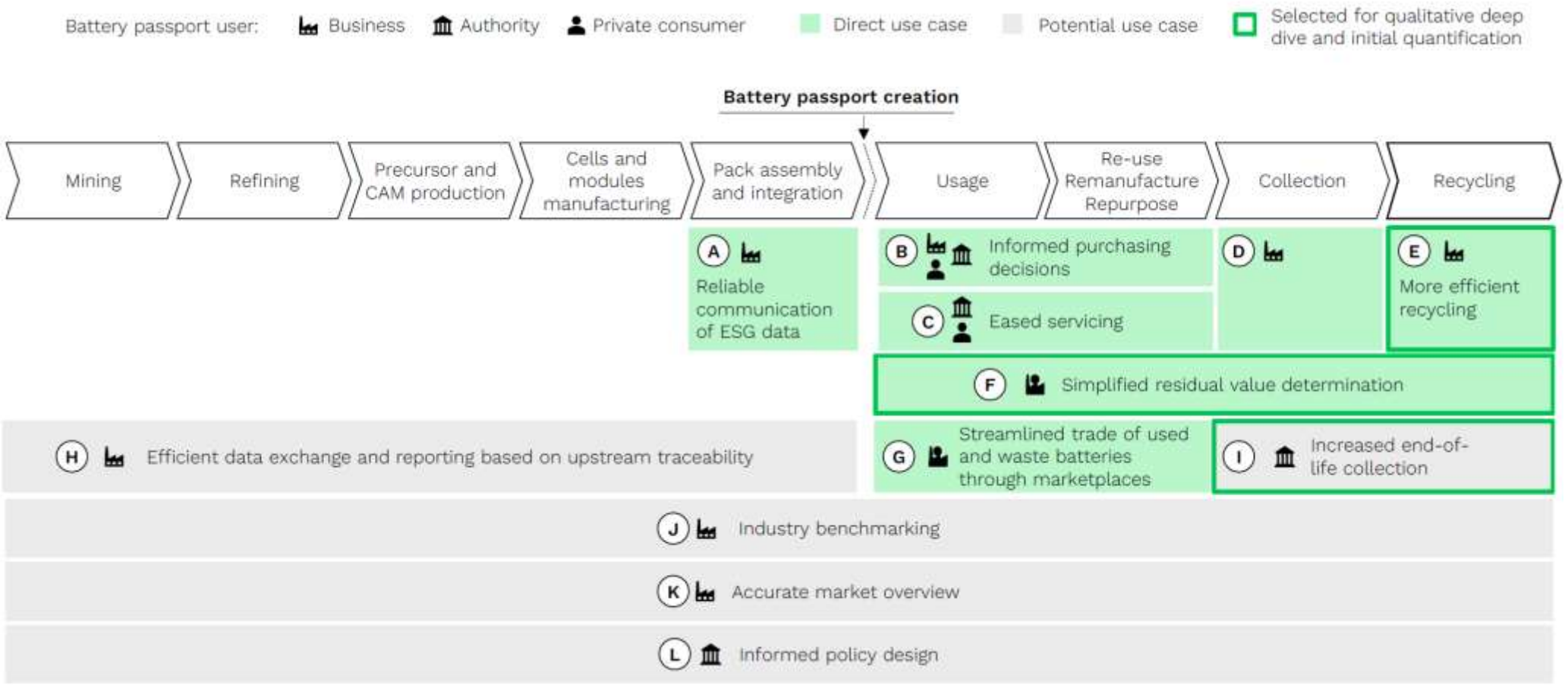

Source: https://thebatterypass.eu/assets/images/value-assessment/pdf/2024_BatteryPassport_Value_Assessment.pdf , (CC BY-NC 4.0).

Beispiel: Battery Passport Data

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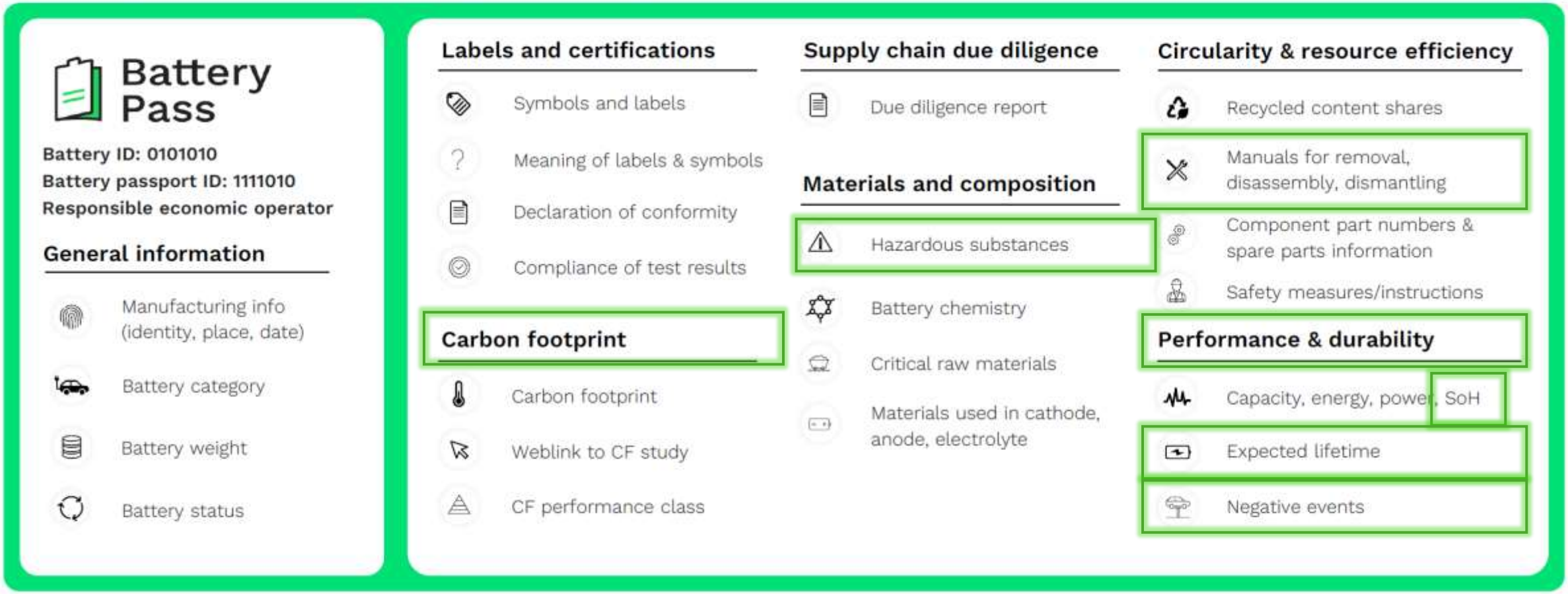
NOT EXHAUSTIVE

Data categories for the battery passport (select data attributes shown below)[1]



Source: https://thebatterypass.eu/assets/images/value-assessment/pdf/2024_BatteryPassport_Value_Assessment.pdf , (CC BY-NC 4.0).

… und mehr

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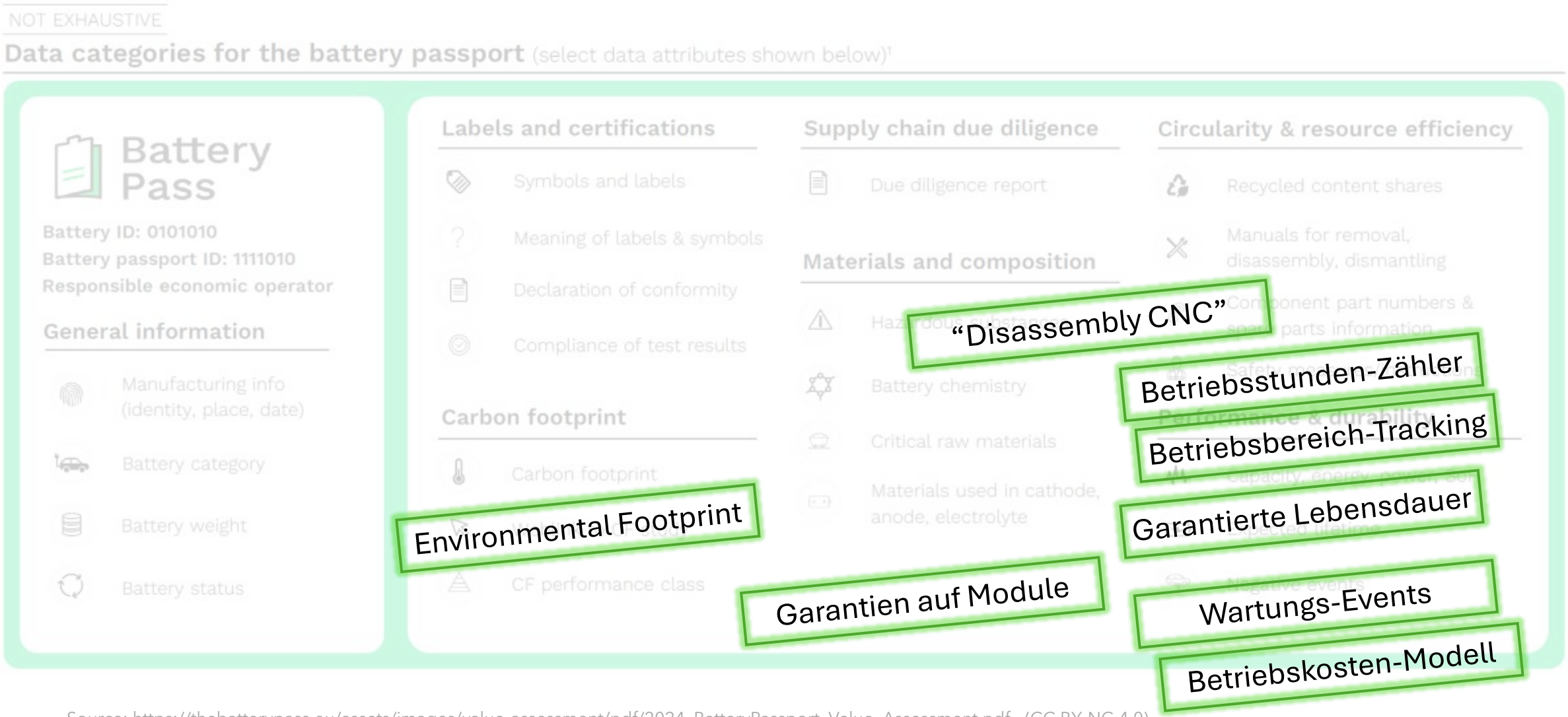

Source: https://thebatterypass.eu/assets/images/value-assessment/pdf/2024_BatteryPassport_Value_Assessment.pdf , (CC BY-NC 4.0).

DPP ermöglicht Hersteller-unabhängige Dienstleistungen

Gruppenarbeit II: Welche Daten? Woher?

Gruppenarbeit II

1-Minuten-Recaps:
Gruppenarbeit 1

Selbstzuteilung

Benötigte Daten

- Welche Daten brauche ich für die Umsetzung der Innovation?
- Wer liefert welche Daten?
- Anreize vs. Vorschrift?
- Schärfung der Innovationsideen!