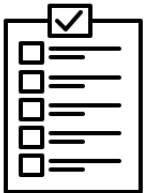


Objective A: Unlocking full potentials/benefits of circular practices through digital technologies.



Objective B: Increasing resource efficiency/independency and reducing the negative environmental footprint of electronics production processes through circular behaviors.



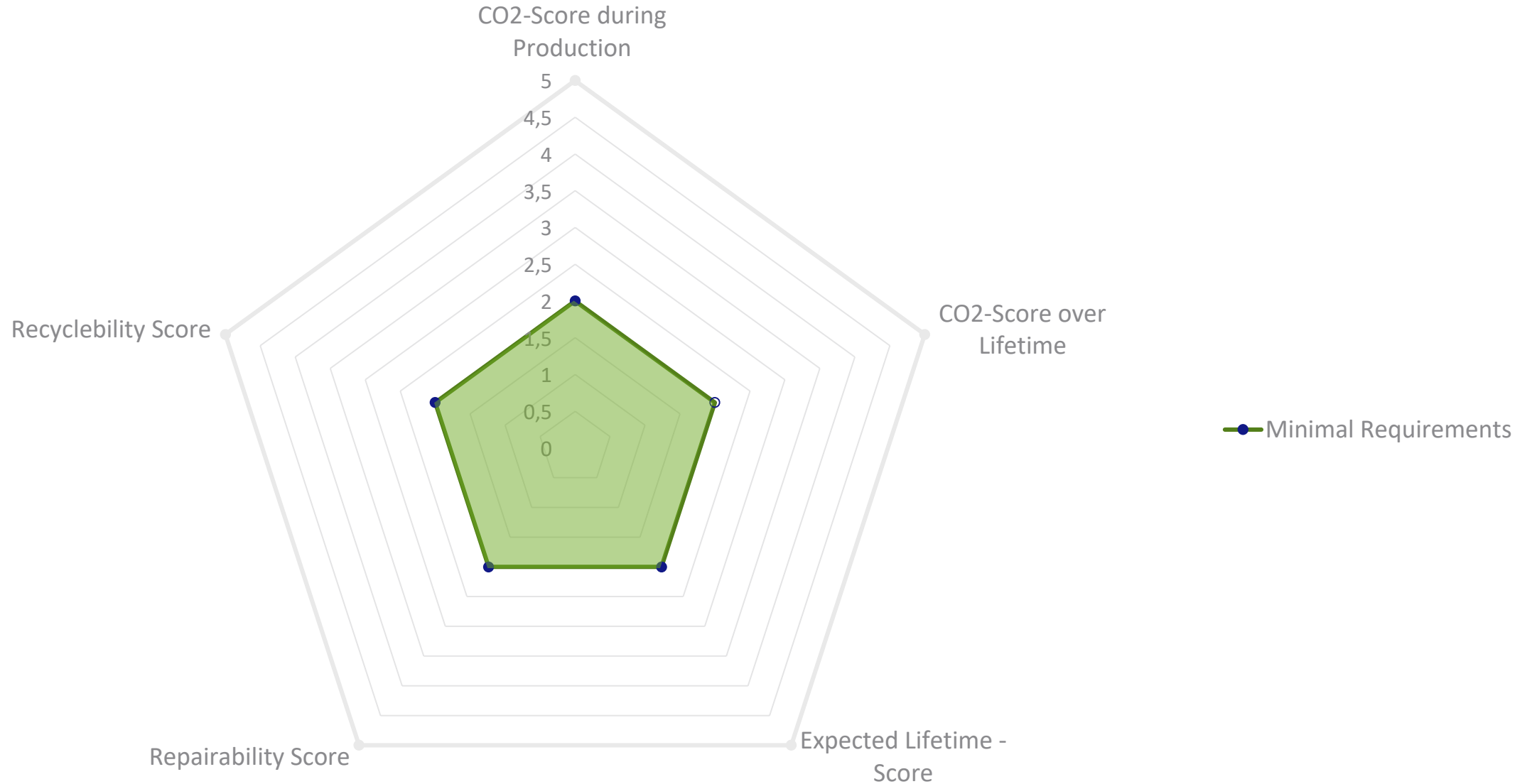
Objective C: Improving/standardize information/data sharing/exchange among industrial leaders involved in the same and/or similar value chain.



Objective D: Demonstrating the benefits coming from Digital Circular Economy through 4 pilots.

Challenges in Green Design

There is no perfectly sustainable product!



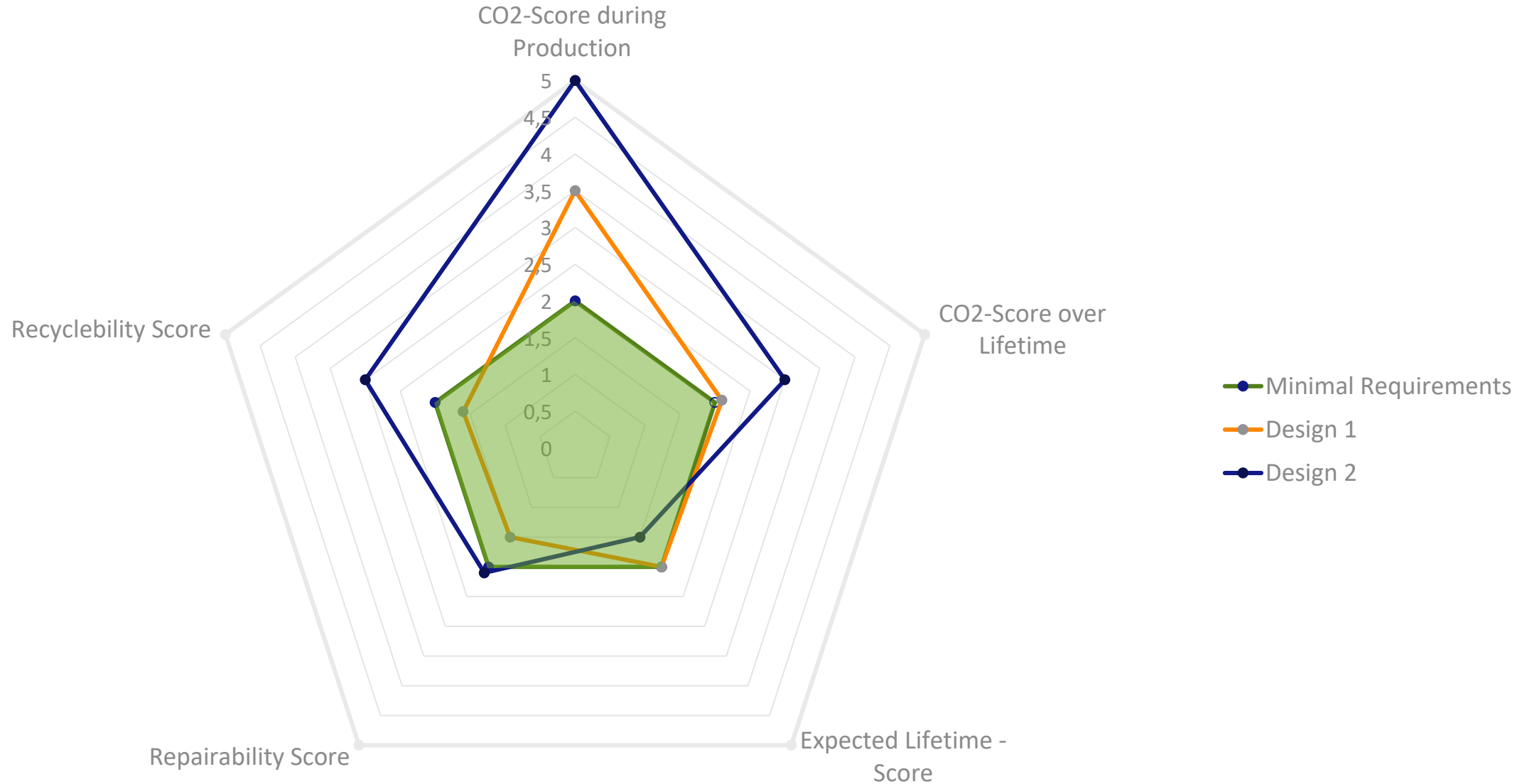
Challenges in Green Design

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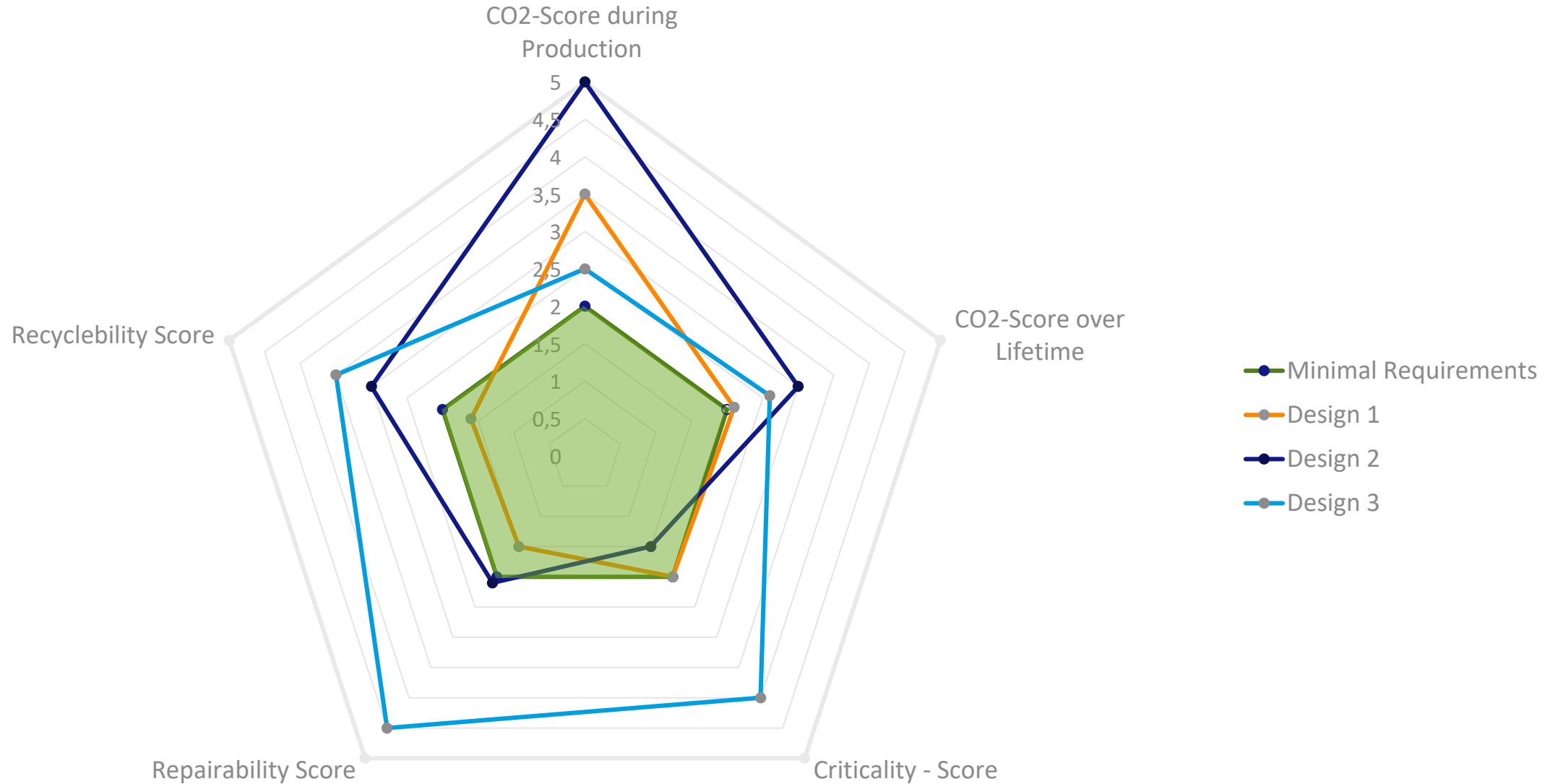
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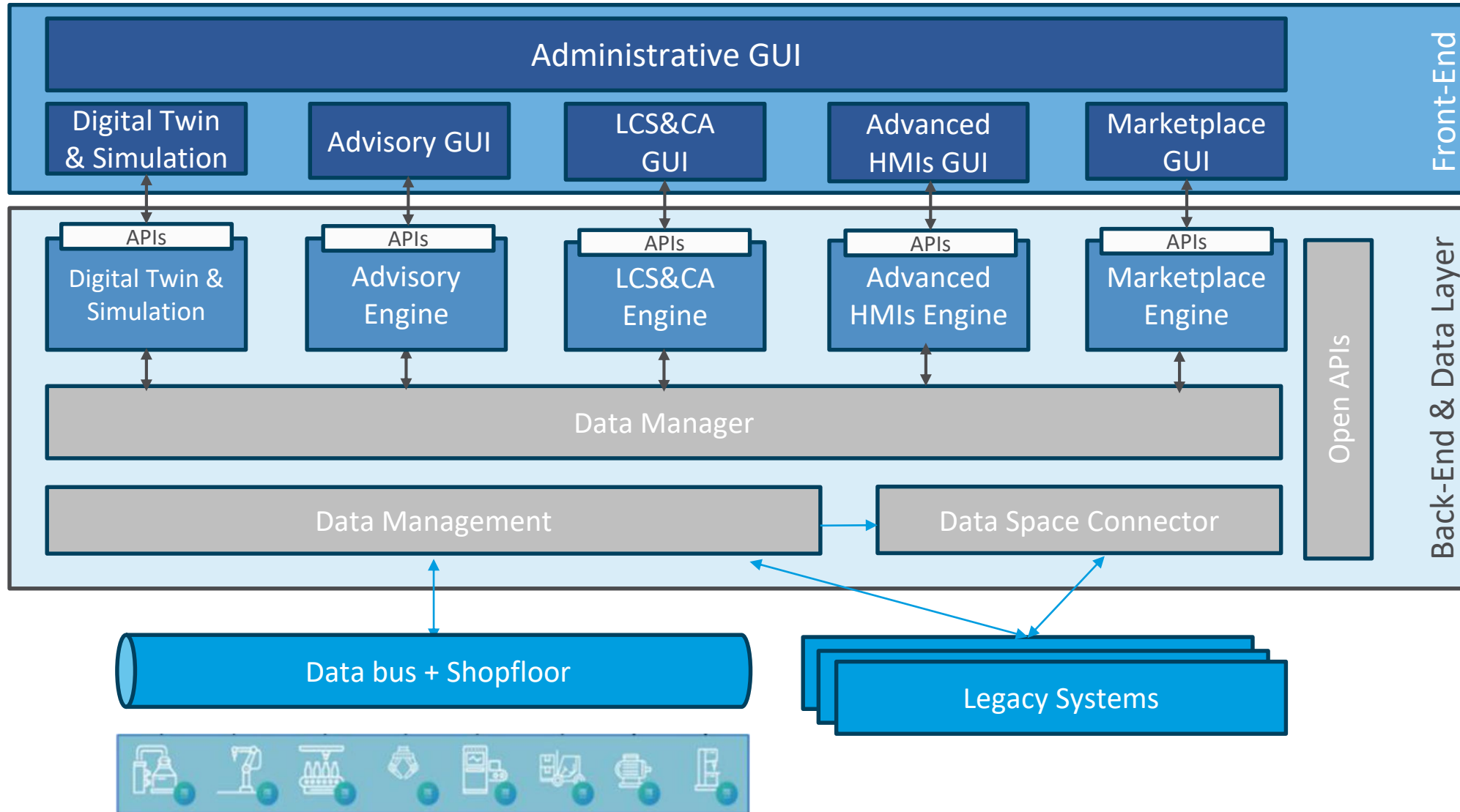
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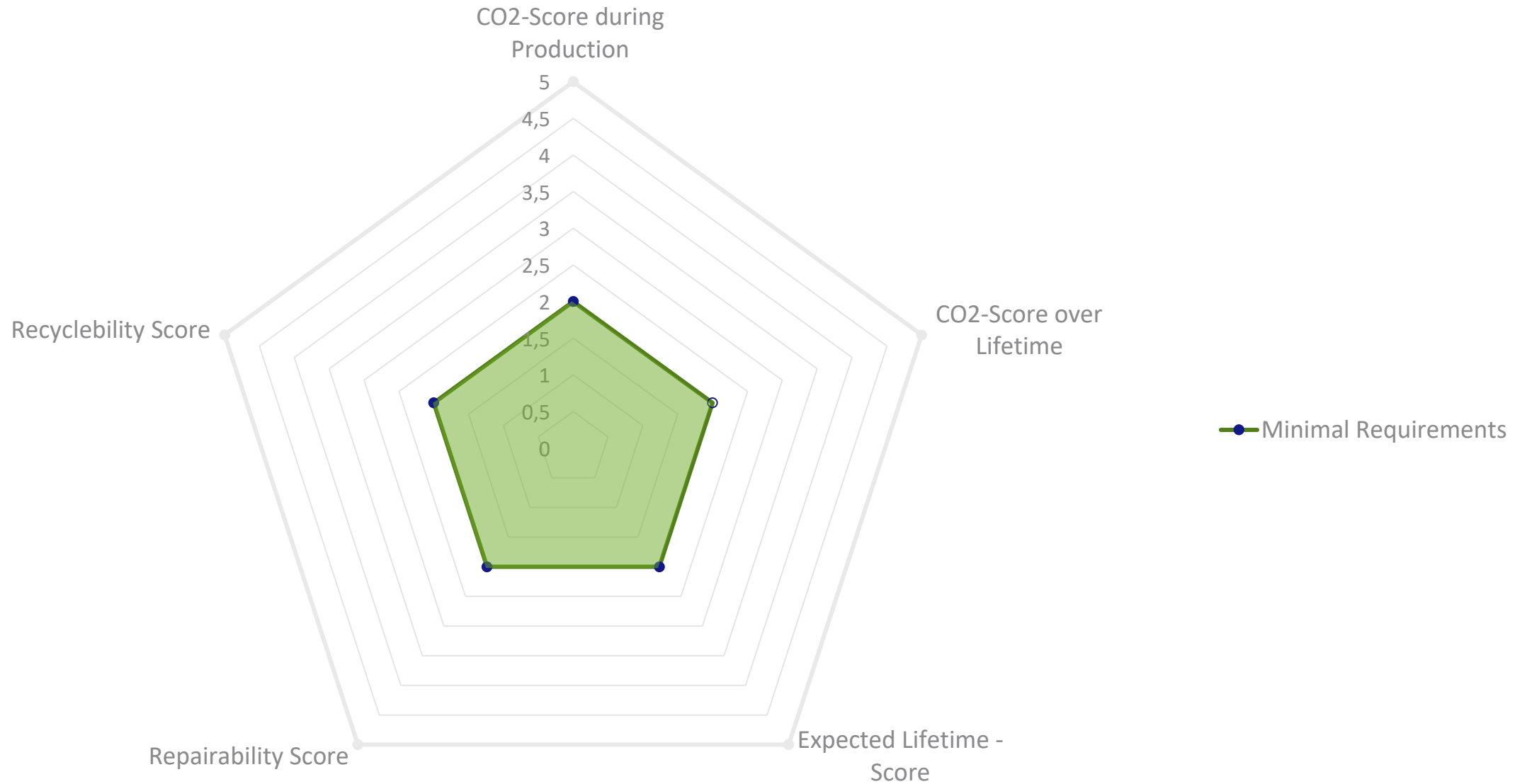


Tool Box

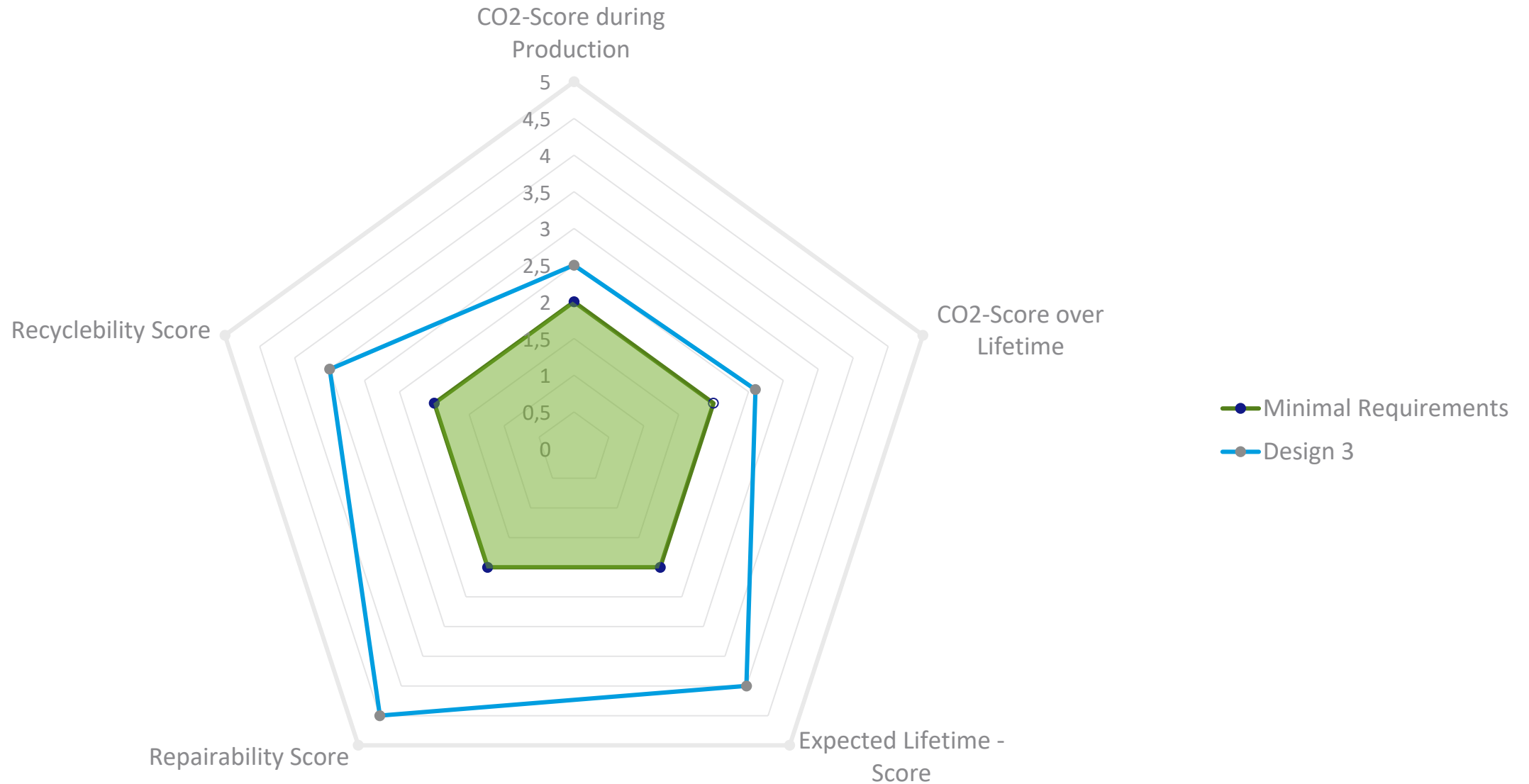
Sustainability Requirements + Targets



Minimal Requirements



Minimal Requirements + Green Design



Design Digital Twin

Design Space Optimization + Support Concept

Housing

- Aluminium
- Plastic

Components

- Standard
- SMT

CPU Selection

- ARM A72
- ARM M4
- RISC V CVA6
- RISC V NOEL5

Solder Paste

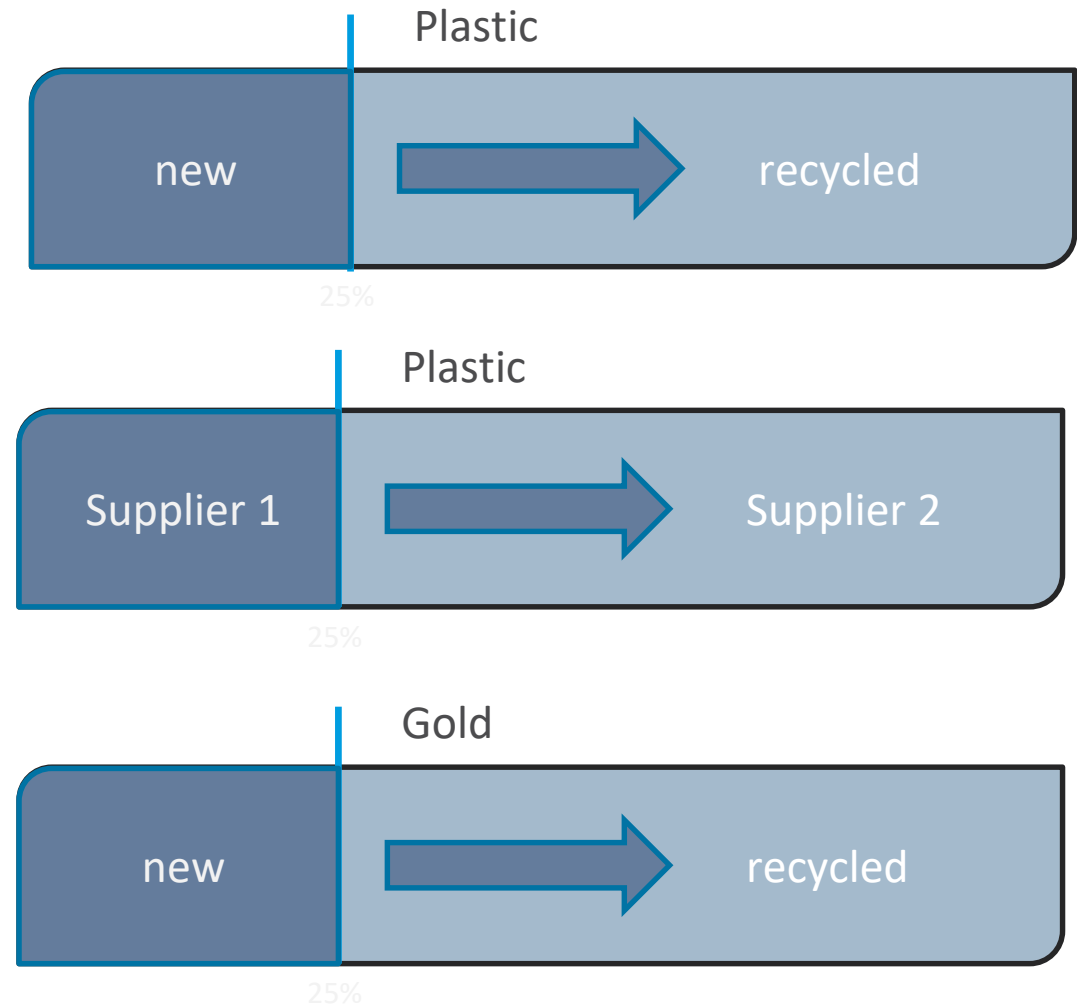
- No-clean
- Lead-free
- Low Temperature

PCB

- Single Sided
- Double Sided
- Multi - Layer

PCB Material

- Teflon
- Cotton Paper and
- Glass and Polyester



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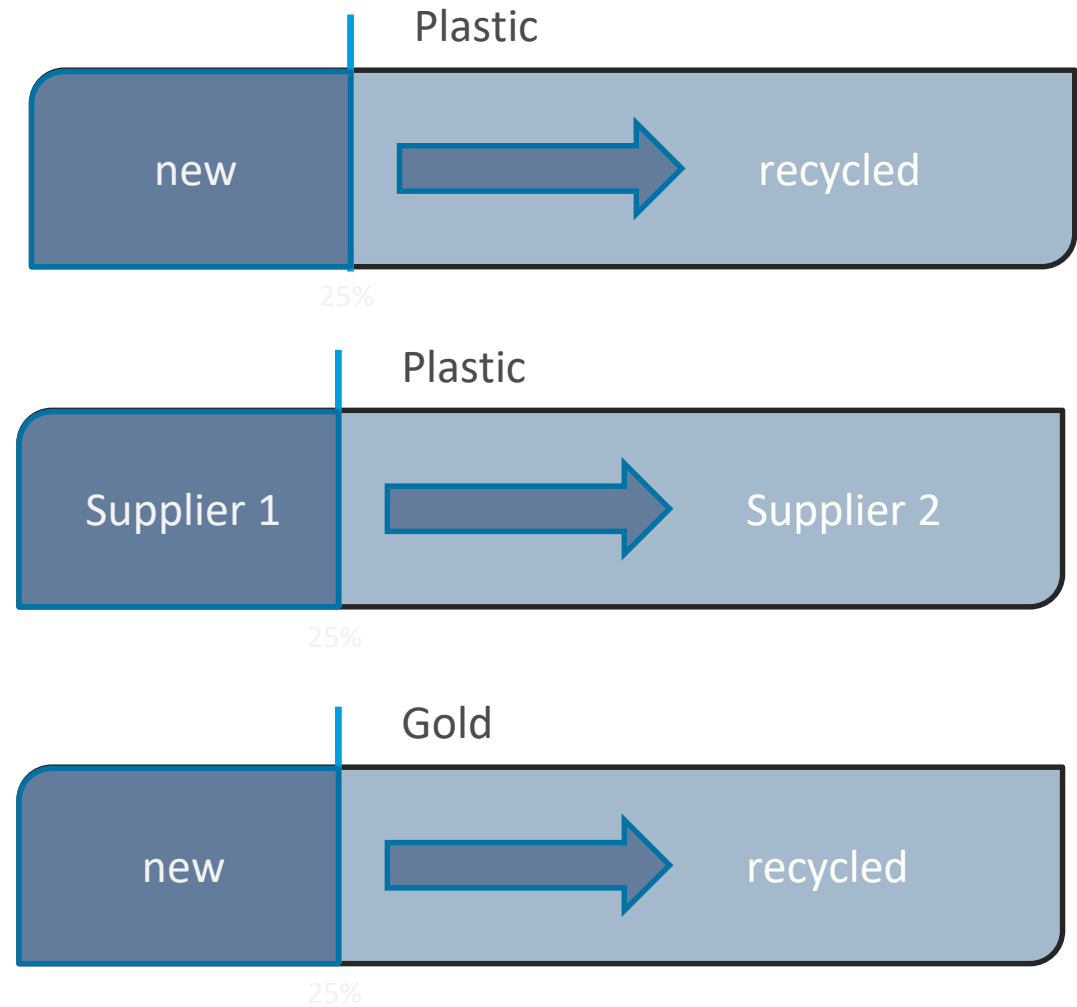
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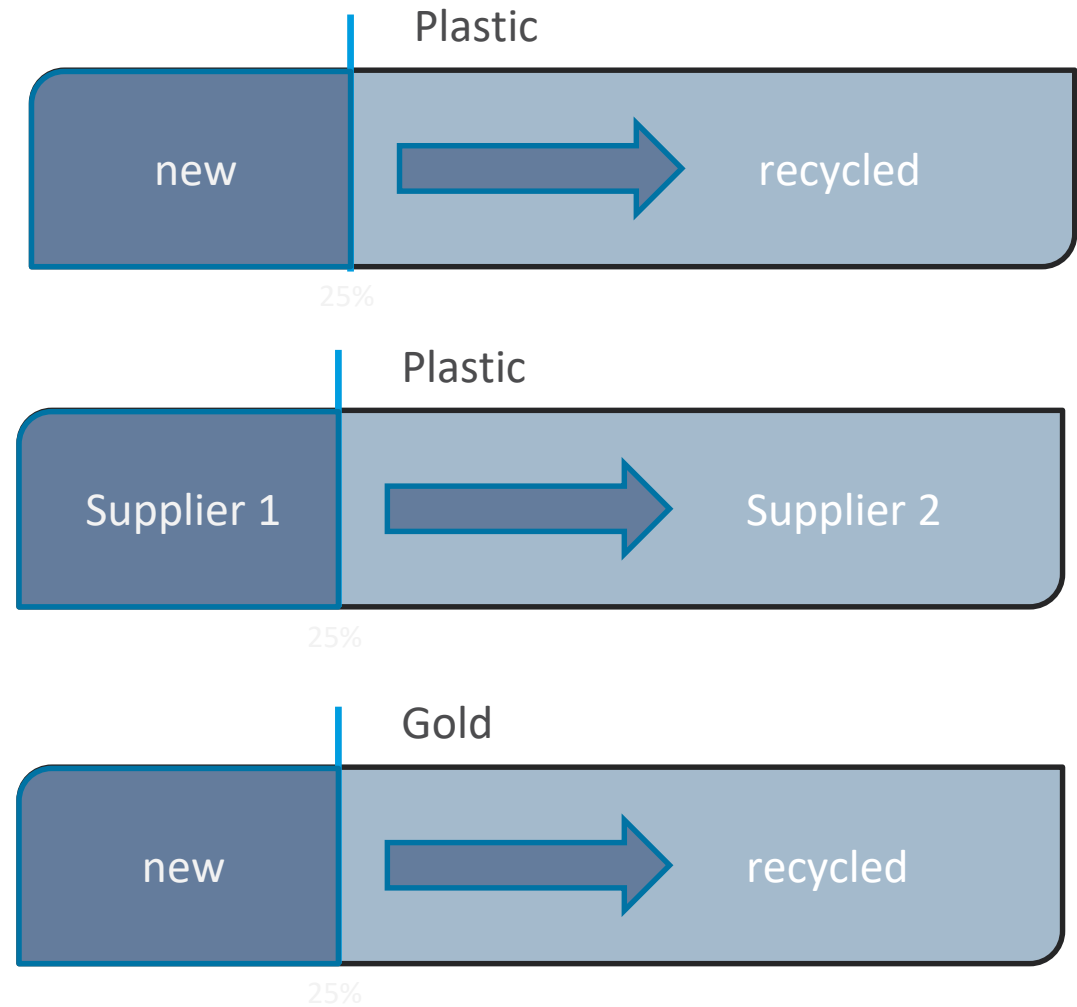
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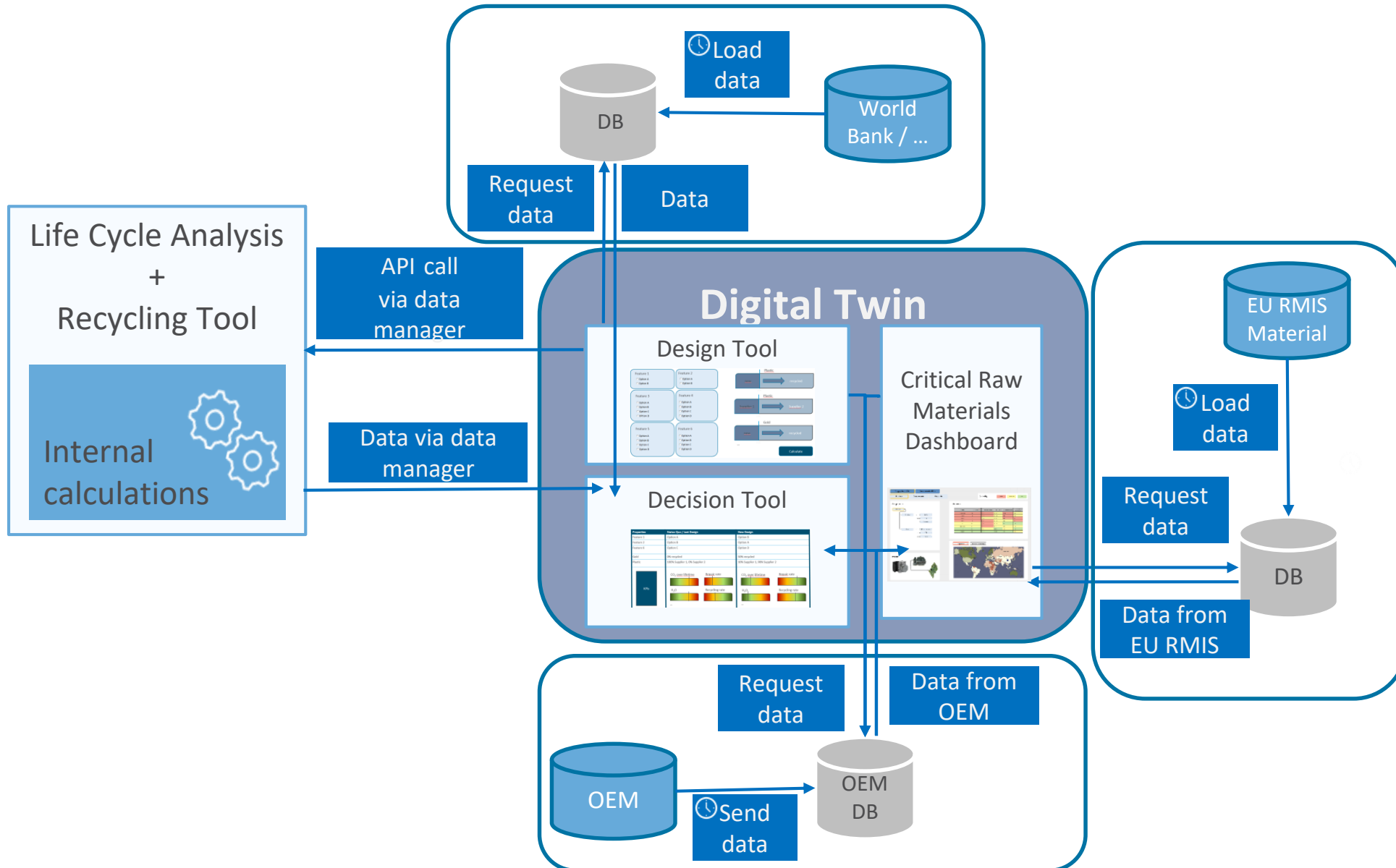
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Design Digital Twin

Tool Architecture

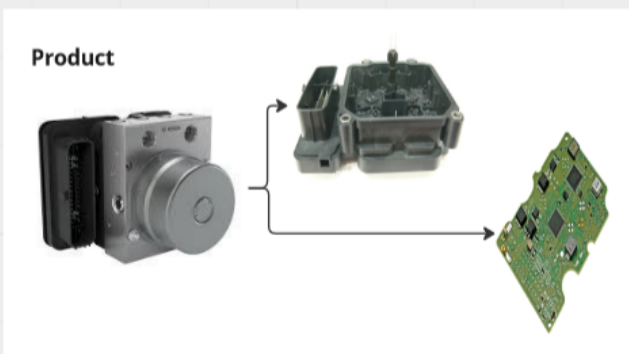
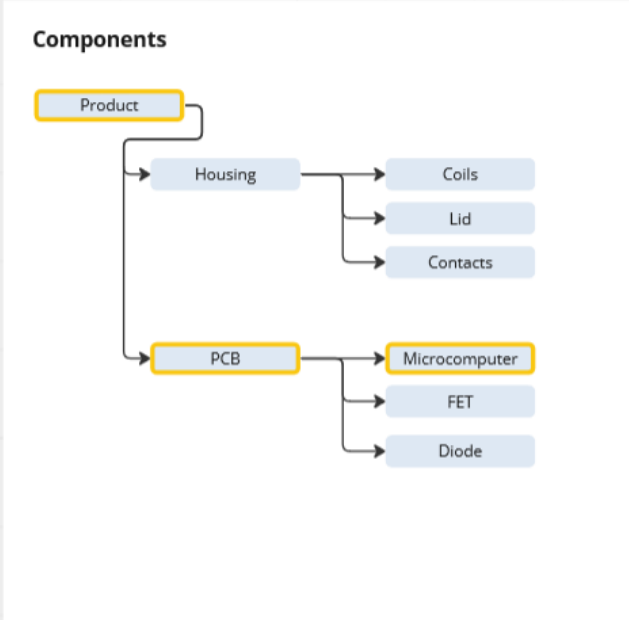


Critical Raw Materials Dashboard + Repairability



Supplychain KPIs
Enviromental KPIs

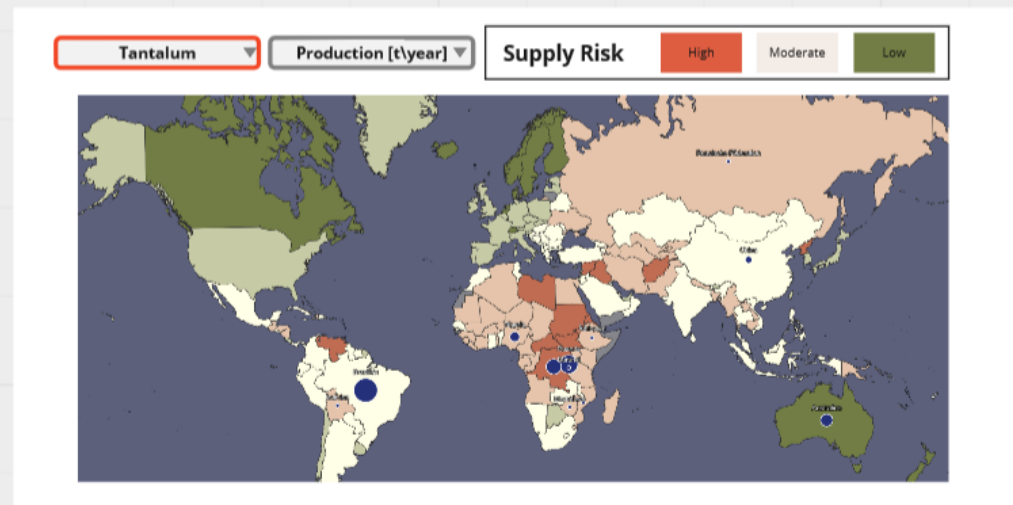
Components
Materials



Materials Microcomputer

Criticality High Moderate Low

Material	Supply Risk	Herfindahl-Index	WGI Index	EU Import Reliance	End of Life recycling rate
Tantalum	1.4	1590	-0.360	99%	0%
Silicon	1.2	4645	-0.1876	63%	0%
Tin	0.9	2845	-0.2058	0%	31%
Silver	0.7	1066	0.0022	40%	19%
Aluminum	0.6	3215	-0.0111	59%	12%
Nickel	0.5	1583	0.1849	28%	17%
Copper	0.3	1176	0.1998	44%	17%
Gold	0.2	489	-0.0221	N/A	29%





CONTINENTAL

TIRE SENSORS

CURRENTLY DISCARDED WITH TIRE

→ COMPARISON OF TWO SUSTAINABLE DESIGNS

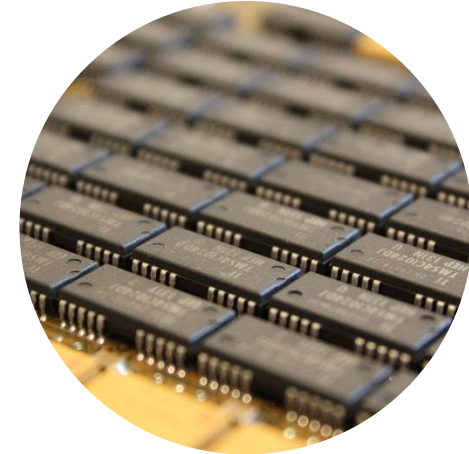


BOSCH

ECUS

LONG LIFETIME DUE TO STRICT SAFETY REQUIREMENTS

→ GET SPARE PARTS AND DESIGN IT SUSTAINABLE



DATACENTERS

PCBS FROM PROFESSIONAL DATACENTERS

REPAIR NOT USEFUL

→ IMPROVE RECYCLABILITY (FOR CRITICAL RAW MATERIALS)