

GEFÖRDERT VOM



Bundesministerium
für Bildung
und Forschung



11.– 12.05.2021 | ReziProK-Statuskonferenz

Circular by Design

**Ressourcenwende über nachhaltiges Produktdesign
von Konsumgütern am Fallbeispiel Kühl-/Gefriergeräte**

Simone Raatz

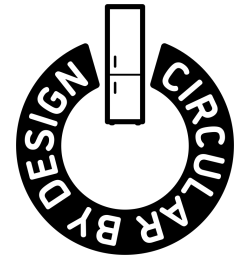
Helmholtz Zentrum Dresden-Rossendorf

Magdalena Heibeck

Helmholtz Zentrum Dresden-Rossendorf

Christoph Tochtrop

Folkwang Universität der Künste & Wuppertal Institut

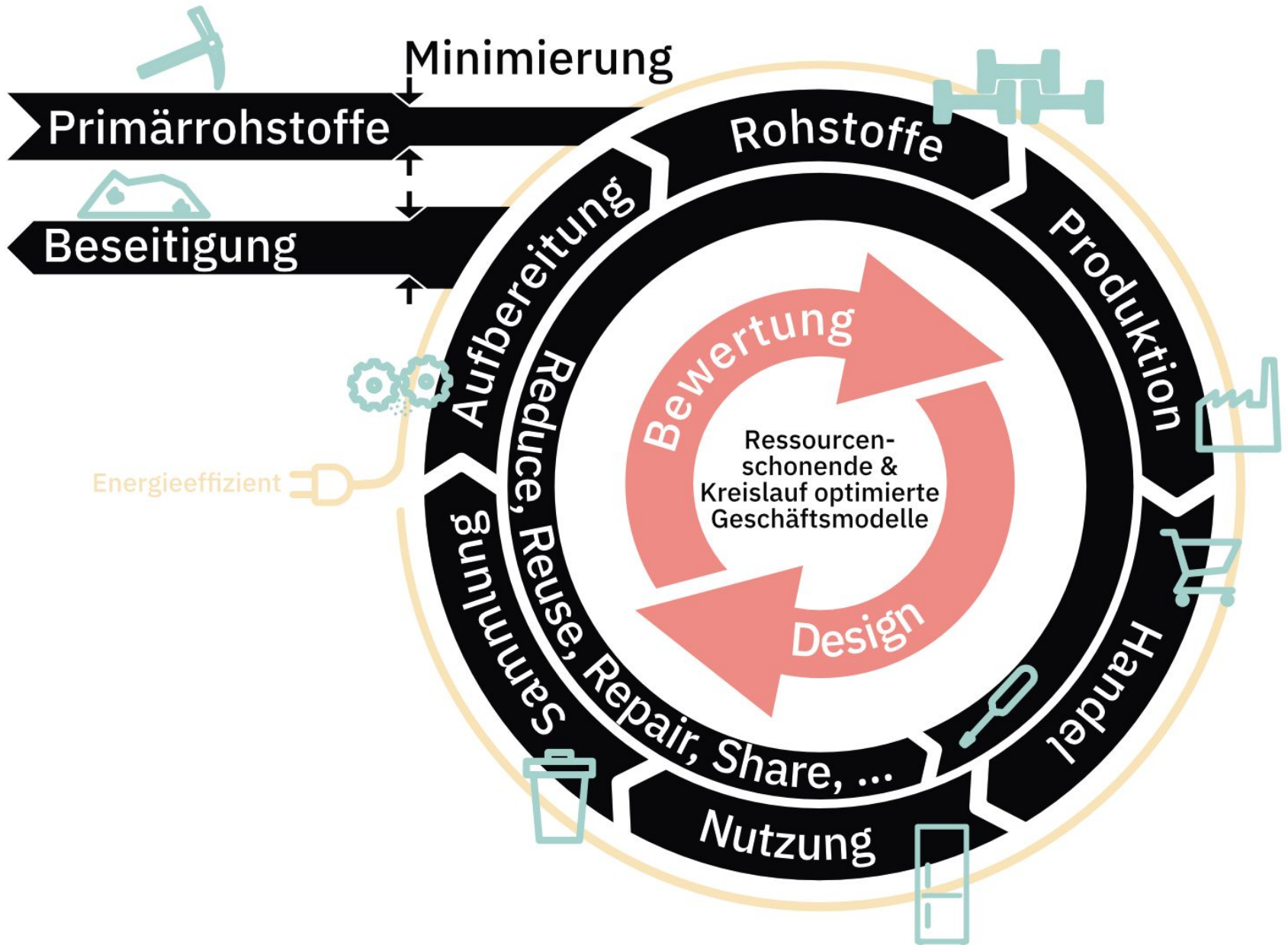


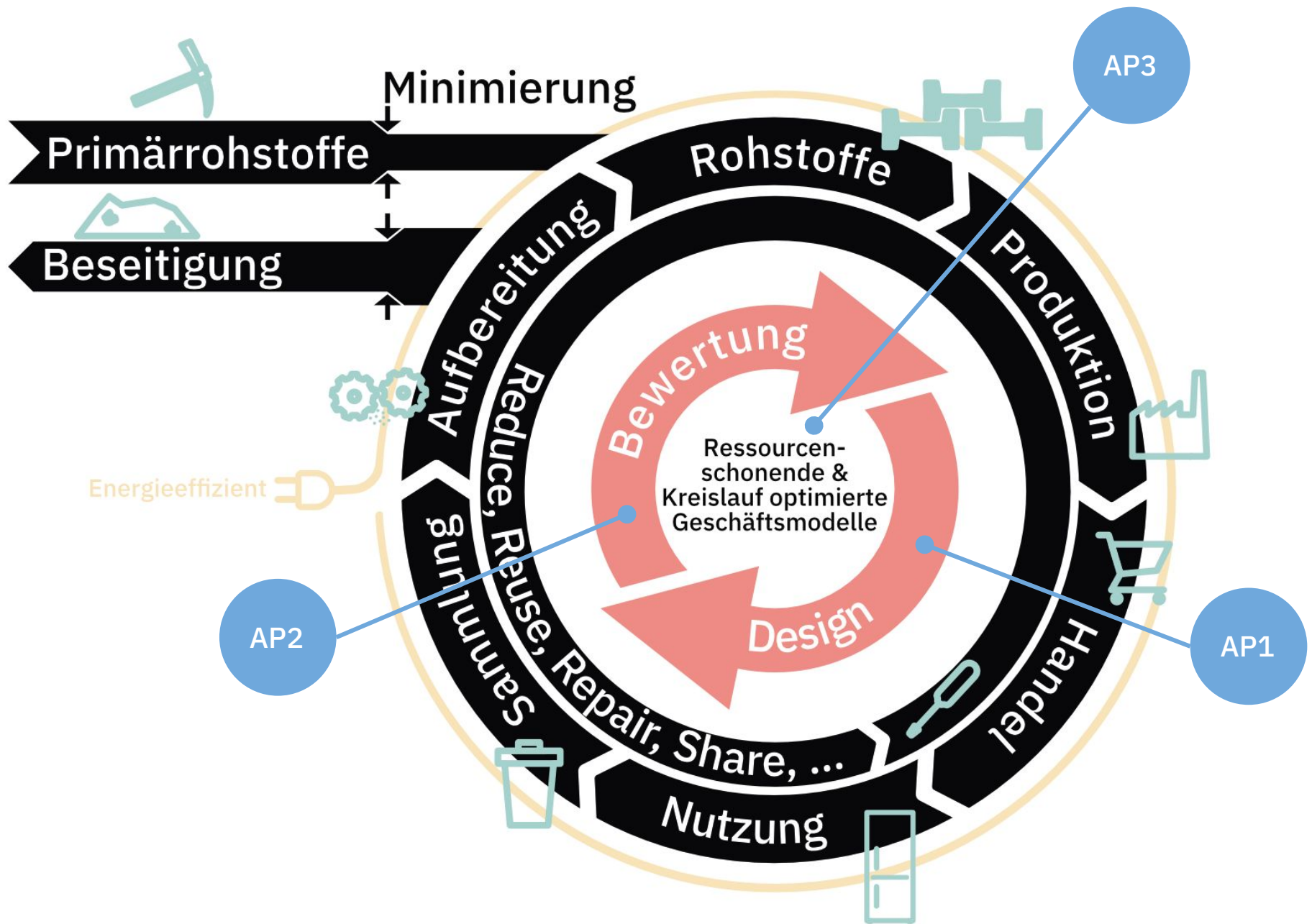
PROJEKTPARTNER*IN



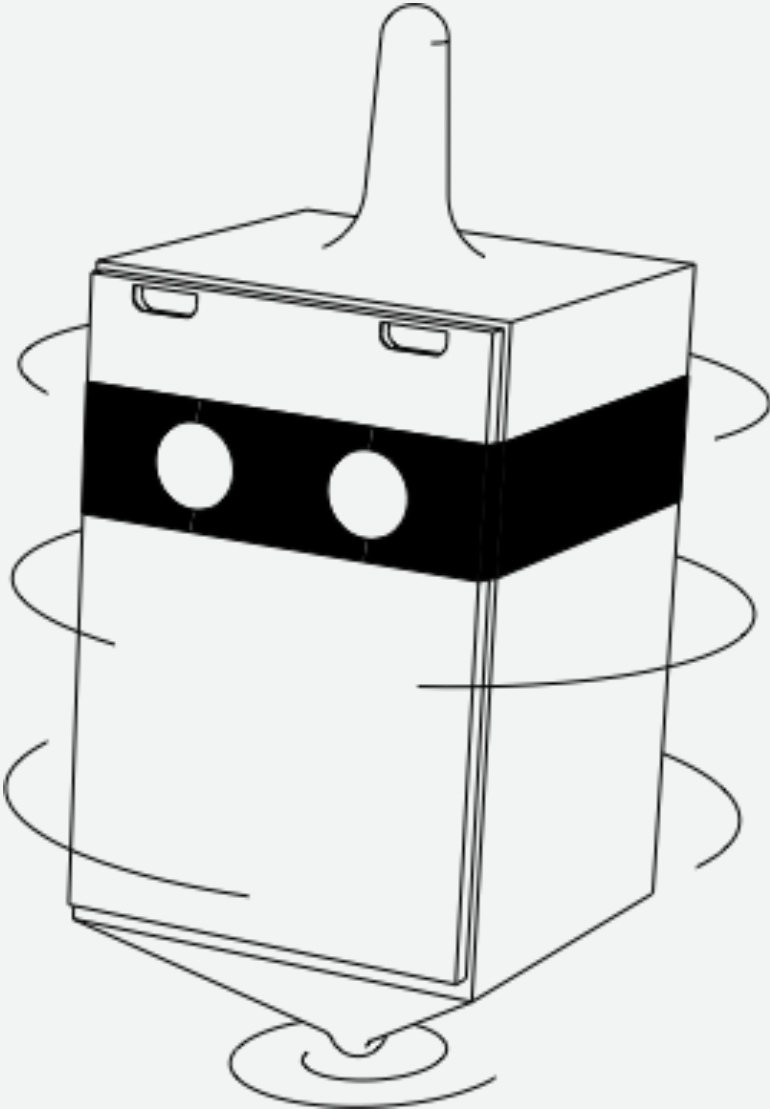
ASSOZIIERTE PARTNER*IN

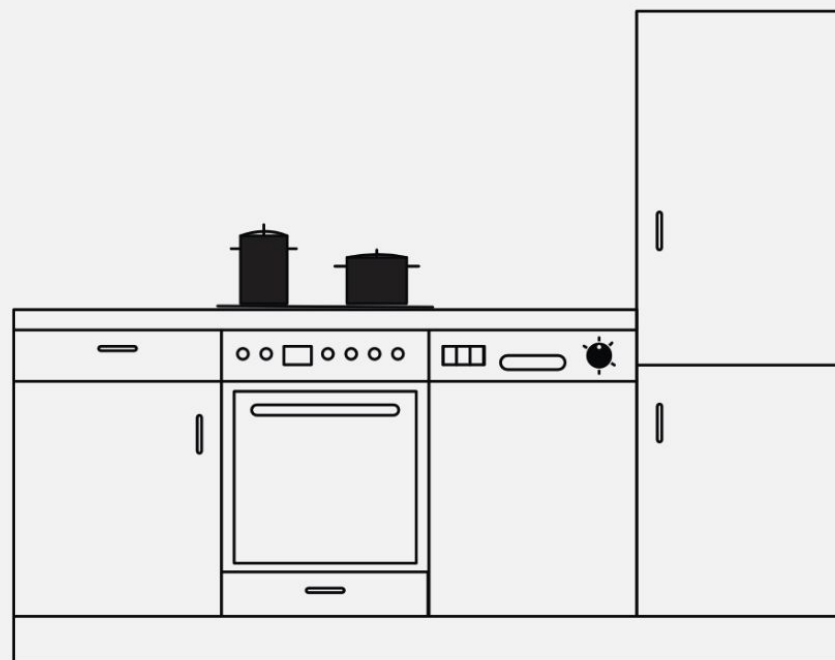
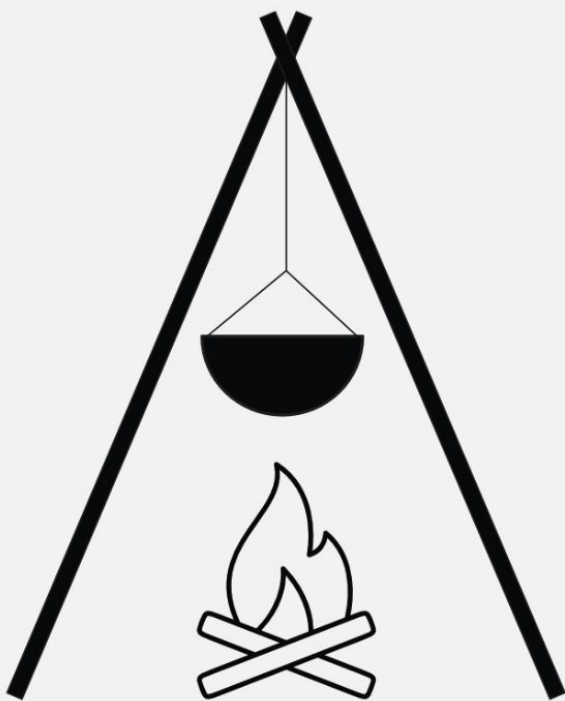




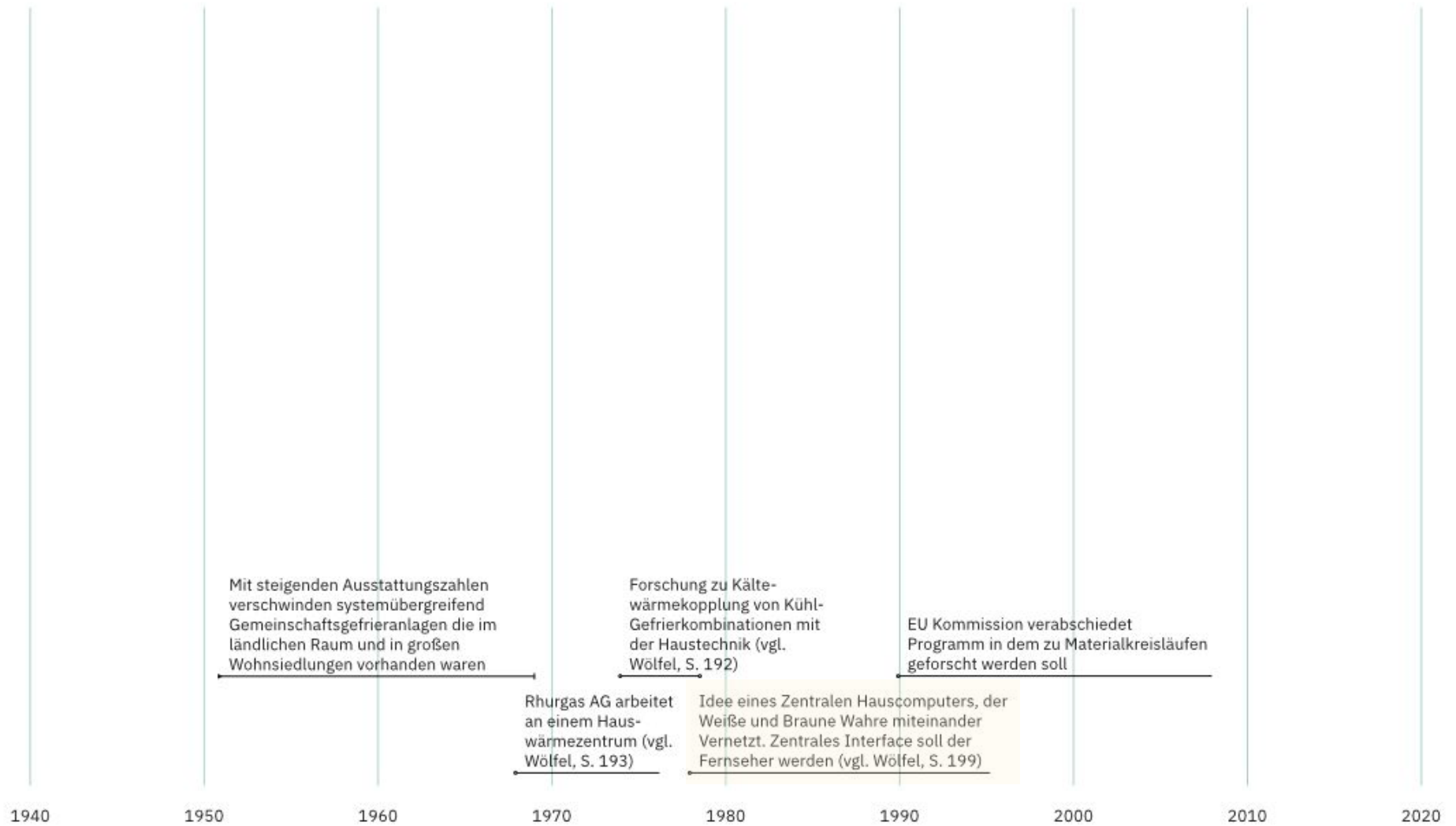


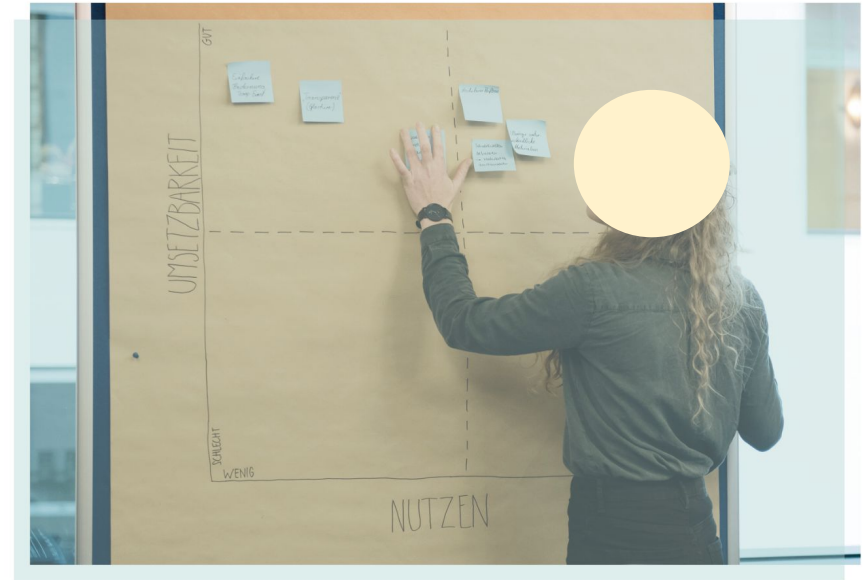
Auf der Suche nach dem kreiselnden Kühlgerät





Ideen die wir Heute wieder haben





Flussbild: Stoffe, Informationen und Geld

Sprecher: Magdalena Alle anzeigen

Christoph Tochtrop

Magdalena

Manuel Bickel (Wuppertal Institut)

Anrufer 01

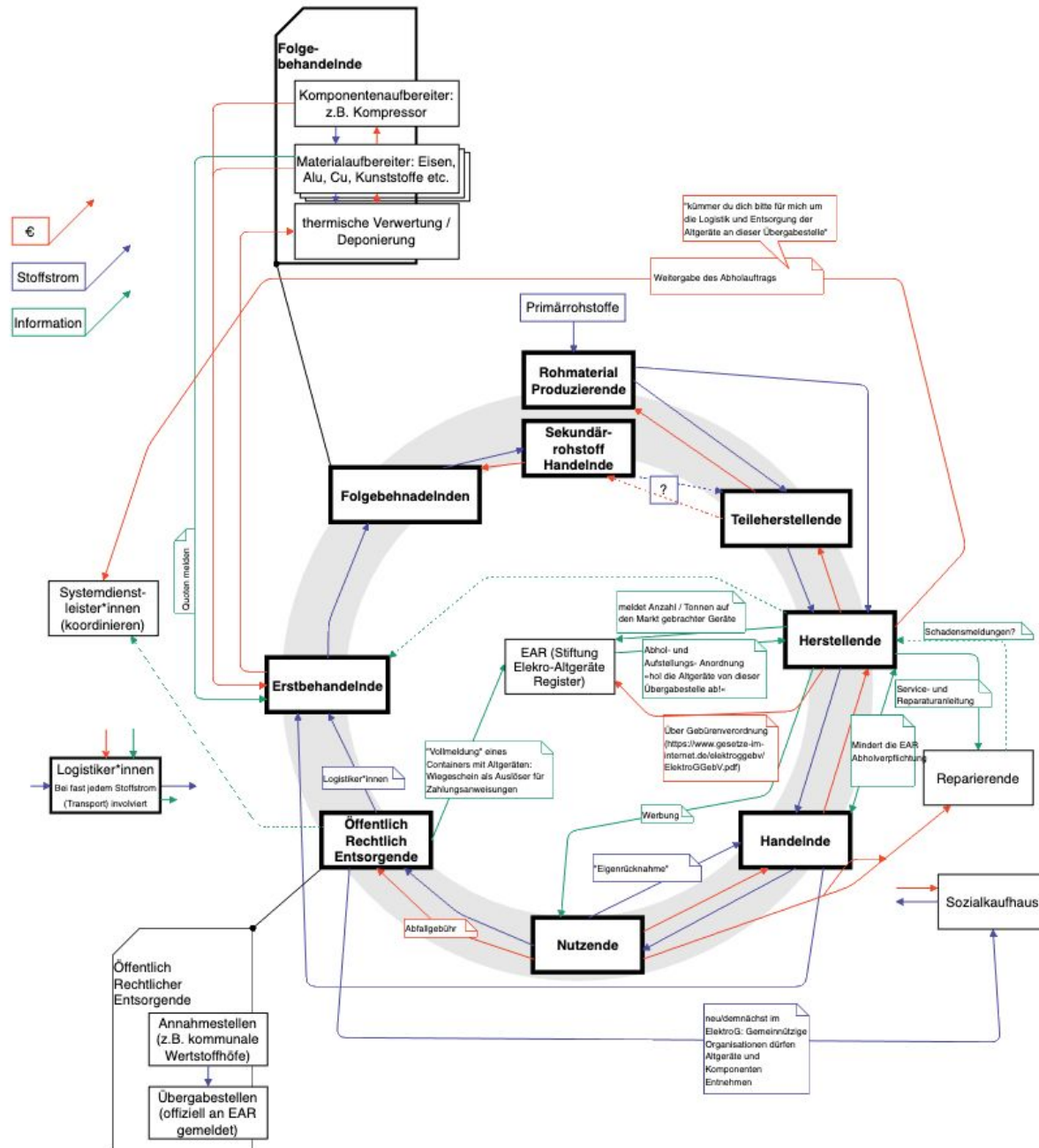
Sascha Förster

monetäre Flüsse Stoffstrom Informationsflüsse

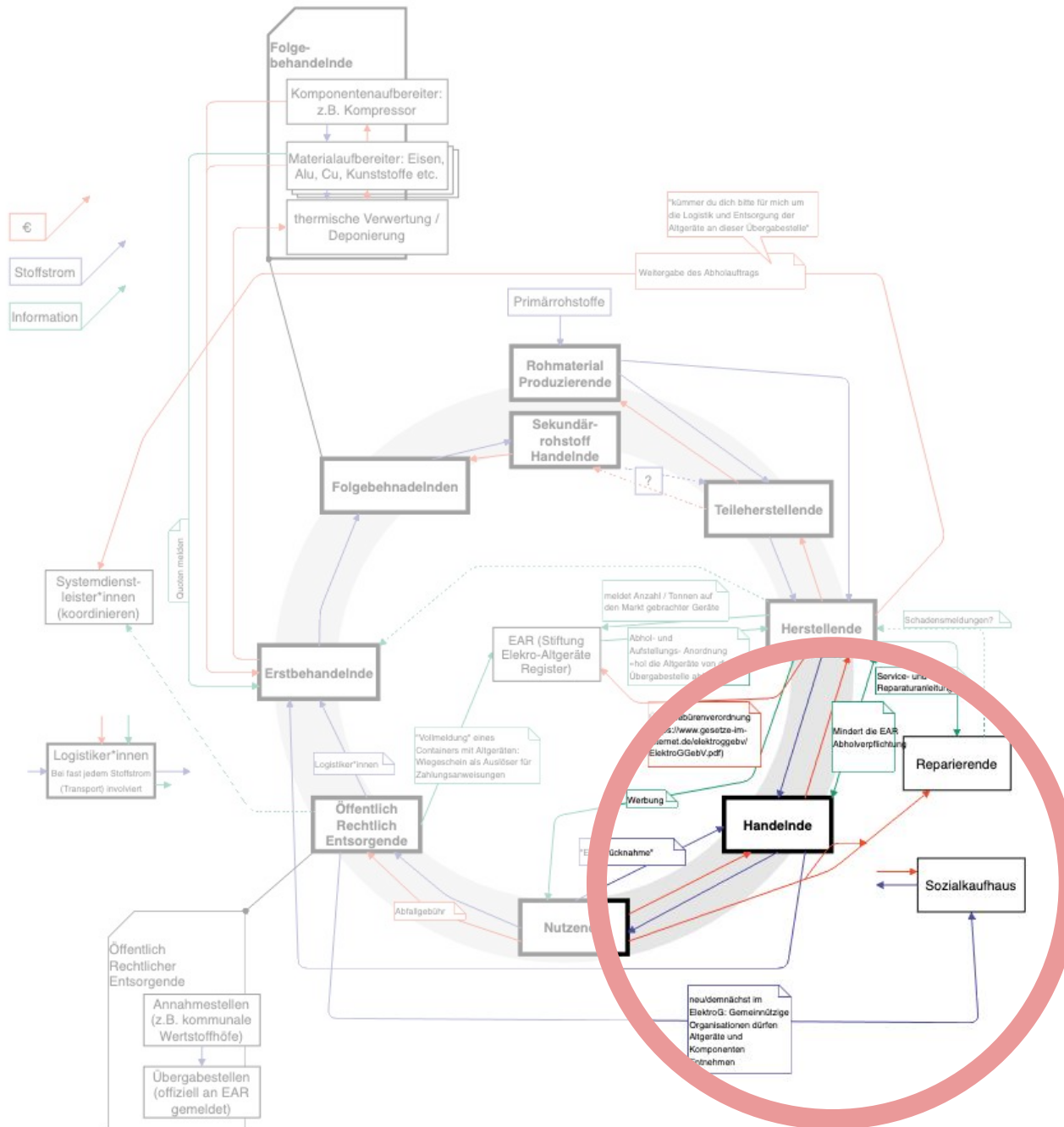
€€ Geldflüsse ~€€

Klicken, um Vortragsnotizen hinzuzufügen

Flussbild: Stoffe, Informationen und Geld



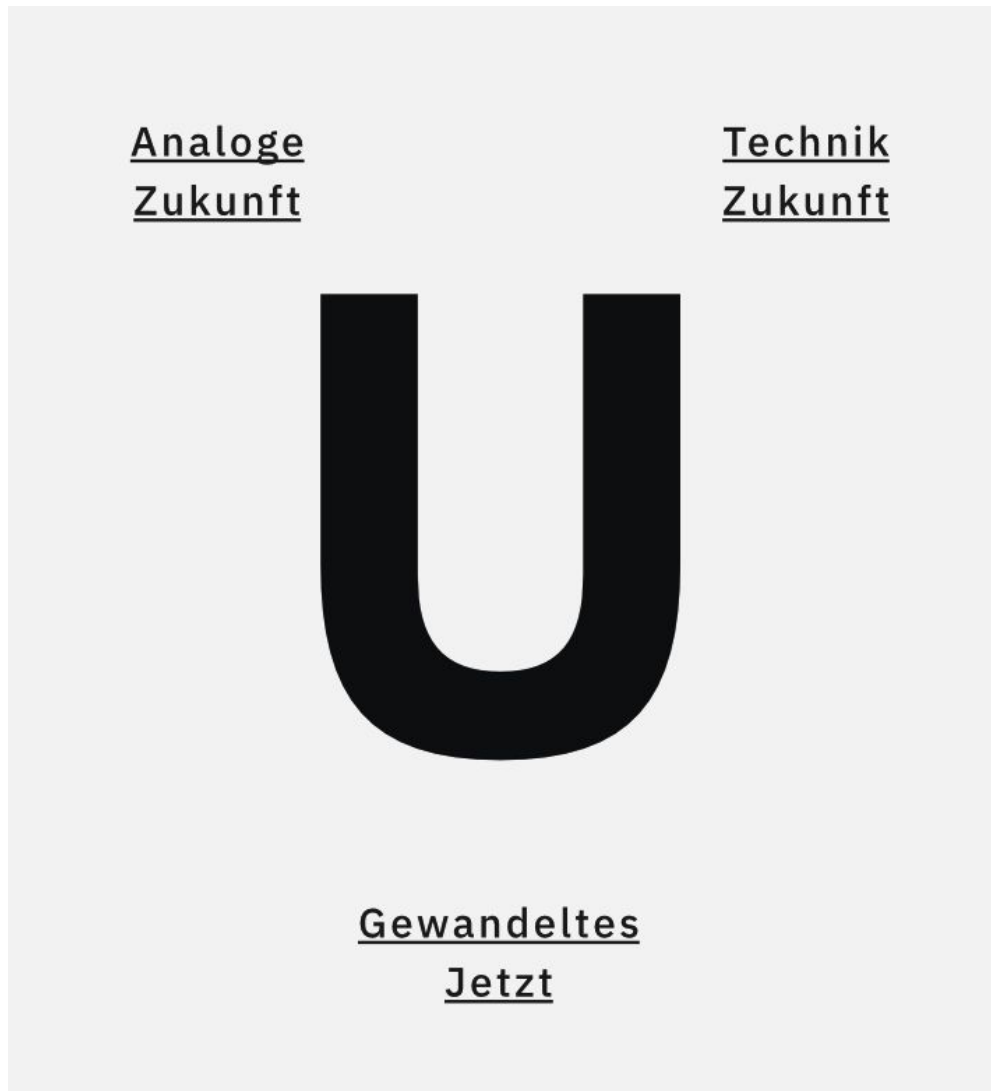
Flussbild: Stoffe, Informationen und Geld



Ideenkarten



Gestaltungsrichtungen



Gestaltungsrichtungen

"Silent the fridge"
A food refrigerator is used to keep things cool without needing any power supply.

Food Delivery: Just in Time
Food is ordered and immediately delivered when it is needed. Therefore the capacity of a fridge is not needed anymore.

Life without Fridge
Cool food delivery trucks are available in cities worldwide. Purchasing fresh produce has become easier. The growing popularity of a supermarket is getting problematic.

Earth Refrigerator
An earth refrigerator is used to keep things cool without needing any power supply.

Exterior Cooling
Outdoor temperatures are being steadily cool down. Cooling can be achieved by the use of the fridge to reduce the energy usage from there might be made through systems that are enabling the food storage in the balcony / garden.

Foodsharing-Fridge
Community Fridges are placed in neighborhoods especially for food sharing reasons.

Alternative Insulative Materials
Alternative used materials are for example fridges are being used as an insulation. These materials need to be easy to handle or recyclable.

Panel Construction
The outer shell of the fridge is constructed of modular, easy-to-use material.

Chain Connector
A chain connector is used to join the shelves of the fridge. This can be combined with modular exterior panels. Therefore the fridge can be disassembled more easily.

Cool Chain Delivery
Delivery services are able to deliver fresh food into the customer's neighborhood. The delivery energy is not included in the price for the customer.

Window SH Cooling
An evaporative cooling system for the window sill, and small fridges that are placed in the household traps.

Community Fridge
Community used fridges in residential buildings can reduce cooling space for more than just one household.

Low-Tech Fridge Extension
The actual fridge volume can be temporarily extended by the usage of an isolable storage module which is cooled by low-tech cool packs. Therefore the actual fridge can avoid being isolated.

A Central Food Storage
The outer shell of the fridge is added to the household and is made of a transparent cooling space for all groceries - cooled and not cooled.

In-Door Lighting
The lighting in the door and illuminates the interior of the fridge when being opened.

Cooling Door
The refrigerator is cooled to its side. Therefore the cooling technology is located in a wall niche instead of an insulated door or a wall niche.

Transparency of the Inside
A transparent or see-through refrigerator is possible. This allows the user to see the contents of the refrigerator and can prevent from long searches for specific things.

Compatible Storage
Shelves for compatible things can be used in the refrigerator. This allows the user to store things in a more organized way.

Fridge Disposal
A disposal point where a refrigerator is placed. The garbage when the refrigerator is broken can be recycled.

Short-Term Stored Fridge
A service offering short-term stored fridges can be used for special events or occasions, where the fridge is not needed for a long time.

Connected Cooling
A refrigerator is more efficient. This can be achieved by the use of the fridge with a cooling system. This allows the user to store things in a more efficient way.

Architectural Cold-Hat Solution
Cooled and heated zones in the building can be more effectively implemented.

Solar Fridge
The fridge is heated powered by solar energy when it is possible.

Planned Fridge
An evaporative refrigerator for the refrigerator is used for special occasions. This allows the user to store things in a more planned way.

Monomaterial Fridge
The outer shell of the fridge is made out of a monomaterial (e.g. Polypropylene (PP)). Therefore the fridge consists out of monomaterial.

Recycling Fridge
The outer shell of the fridge is made out of 100% of recycling materials. This allows the user to store things in a more sustainable way.

Order System
Cooling food is supported in a more efficient way. This allows the user to store things in a more organized way.

Transparency of the Outside
A transparent appearance is possible for the refrigerator. This allows the user to see the contents of the refrigerator and can prevent from long searches for specific things.

Multiple Openings
Similar and new fridge opening possibilities (doors, drawers and...) are enabling less cooling loss when opened.

Lamella Curtain
A transparent curtain covering out of the refrigerator can be used. This allows the user to see the contents of the refrigerator and can prevent from long searches for specific things.

Removable Panel in the Inner Wall
When a panel of the fridge is removed, the fridge interior is exposed with a new look.

Smart Grid
Through a smart grid the fridge is possible to be connected to the smart grid. This allows the user to store things in a more efficient way.

Utilization of Residual Heat
The heat that comes through the back wall of the fridge is being reused.

Cooling Block
A temperature sensor based cooling block that can be used to cool things in a more efficient way.

Directional Fridge
The fridge has a clear direction to move the refrigerator of the coolant down away.

Fridge with Barcode
A fridge is provided with an individual barcode. This barcode can be used to track the refrigerator and can prevent from long searches for specific things.

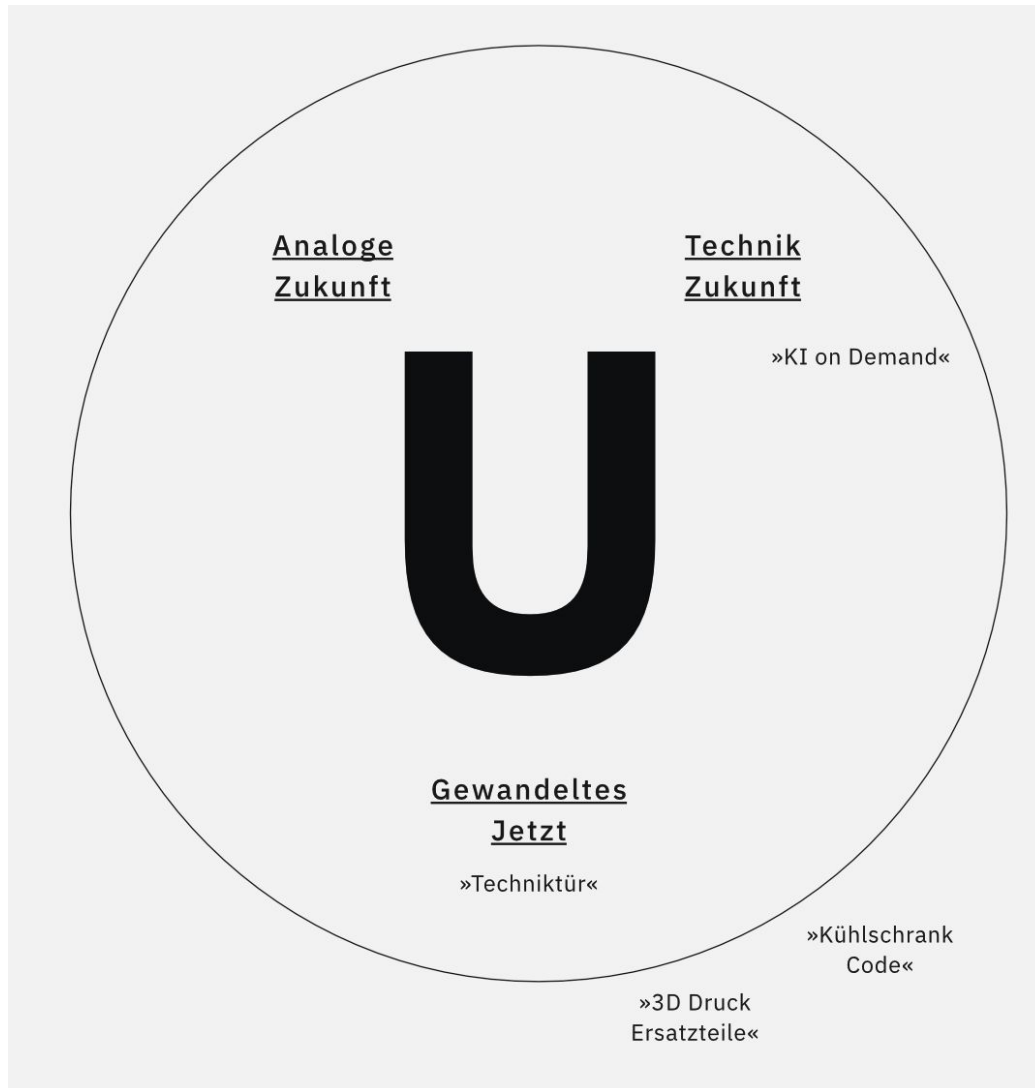
3D-Printed Parts
Open source data is available for the user to 3D print replacement parts for the refrigerator.

Door-Checking / Closing
The fridge door is being checked for the door is closed or not. This allows the user to store things in a more efficient way.

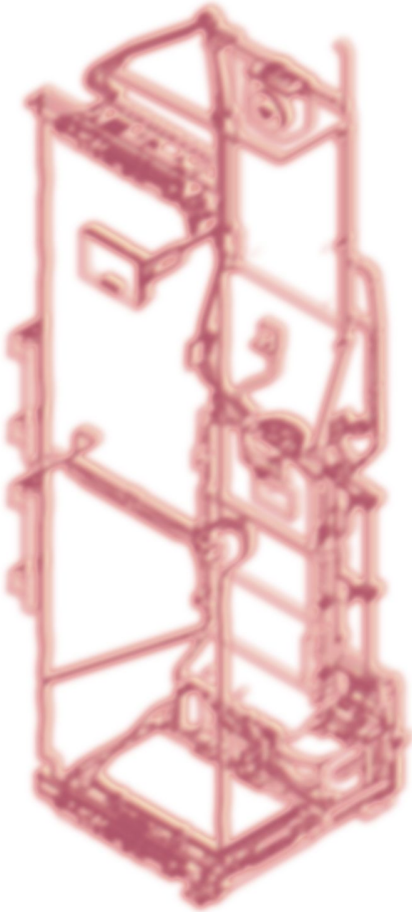
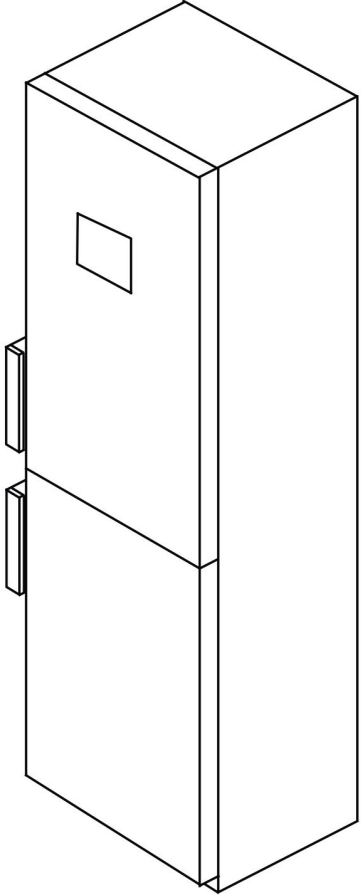
Sliding Door
A sliding door is enabling the user to see the contents of the refrigerator and can prevent from long searches for specific things.

Energy Efficiency Monitoring
The user can monitor the energy efficiency of the refrigerator. This allows the user to store things in a more efficient way.

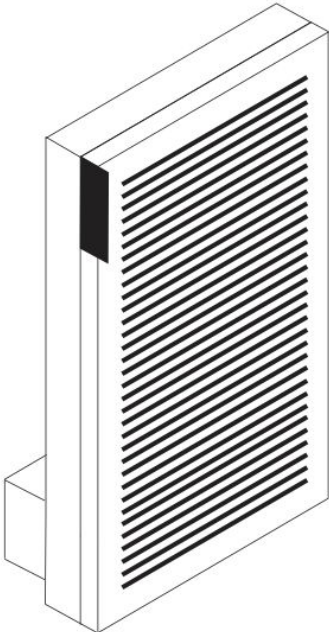
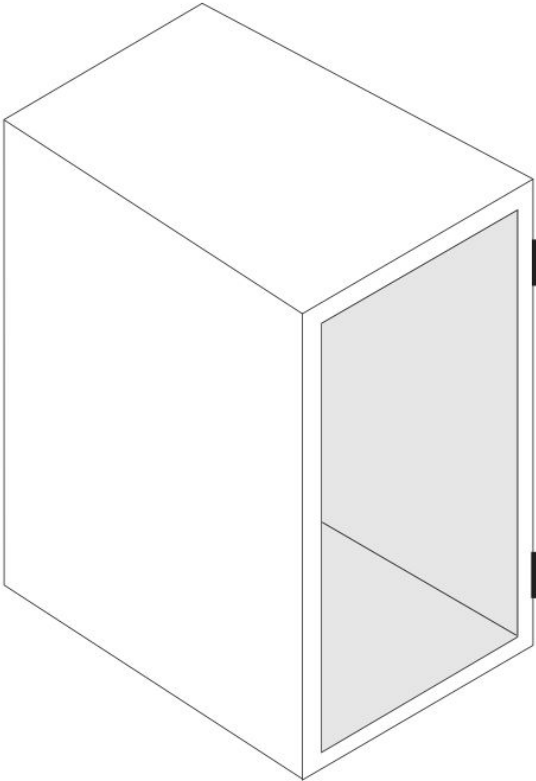
Gestaltungsrichtungen



Design Szenarien – Techniktür



Design Szenarien – Techniktür



Design Szenarien – Die Lieferkette ist der Kühlschrank

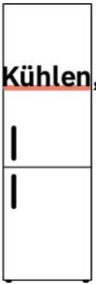
Anbauen, Ernten,

Essen



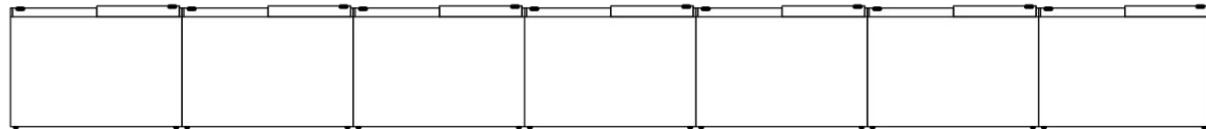
Design Szenarien – Die Lieferkette ist der Kühlschrank

Anbauen, Ernten, Transportieren, Waschen, (Einfrieren), Verpacken, Transportieren, Anbieten im Supermarkt, Verkaufen, Transportieren, Kühlen, Essen



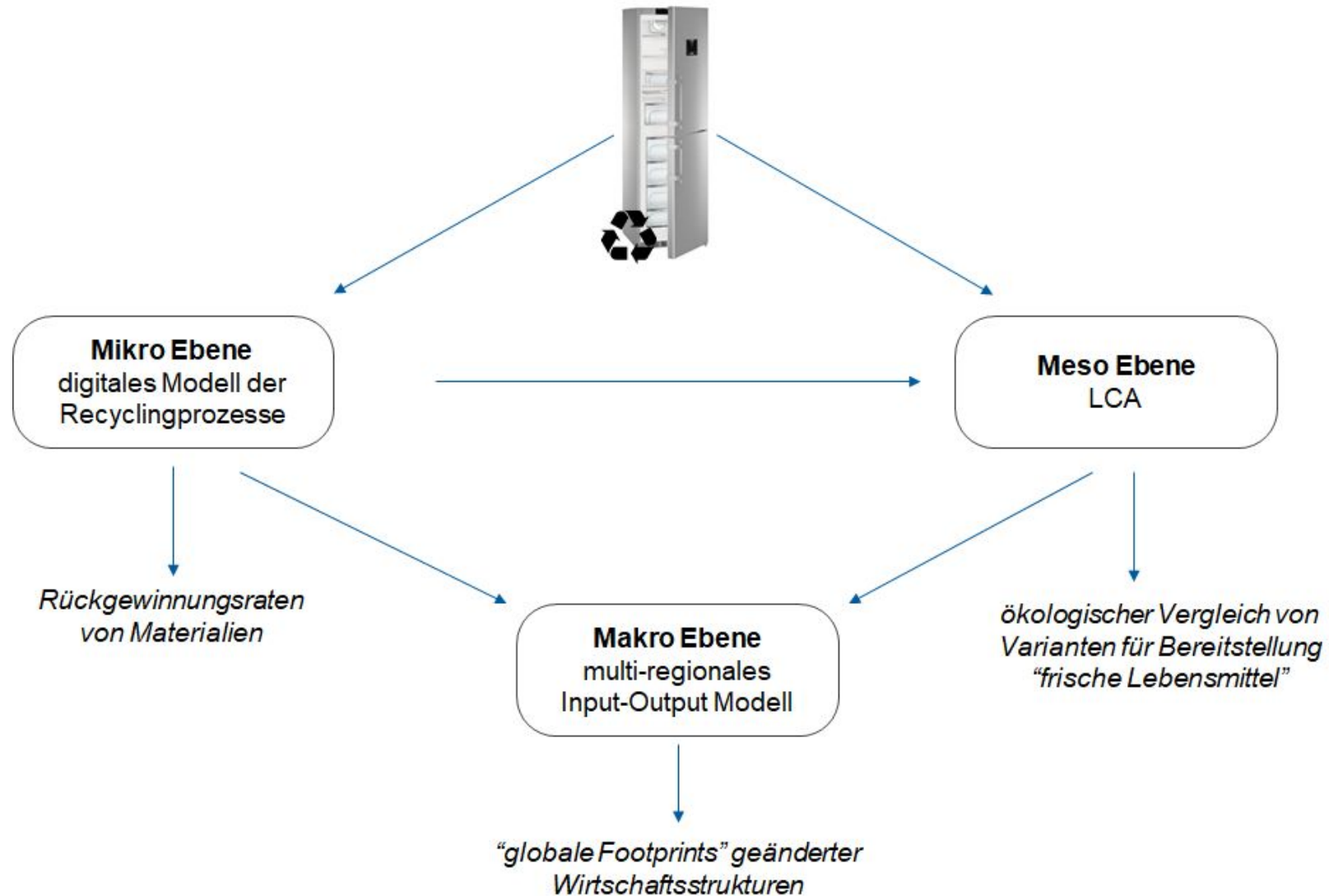
Design Szenarien – Die Lieferkette ist der Kühlschrank

Anbauen, Ernten, Transportieren, Waschen, (Einfrieren), Verpacken, Transportieren, Anbieten im Supermarkt, Verkaufen, Transportieren, **Kühlen**, Essen





AP2: Bewertung des Designs

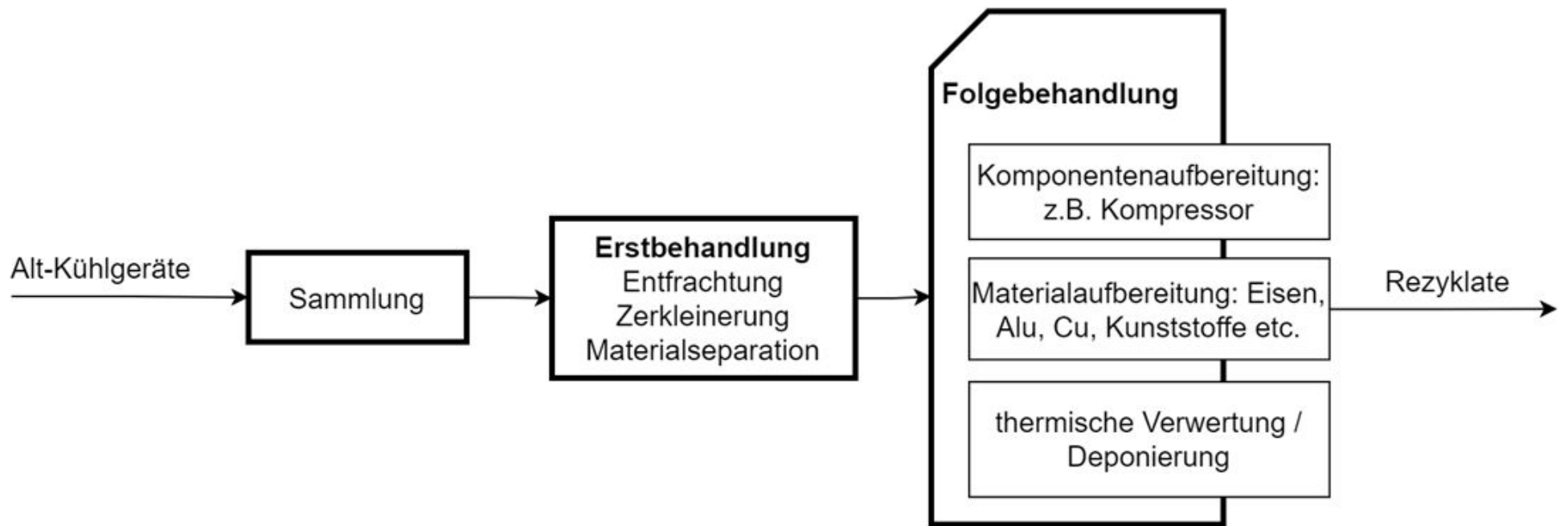




Stahl
Polystyrol
Kupfer
Alu



Kältemittel
Treibmittel im Isolierschaum
Kompressorenöle
Flammschutzmittel



Herausforderungen

Design

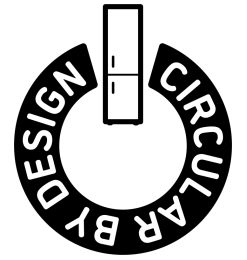
- Fokussierung vs. Multilevel

Bewertung

- **Datenbeschaffung**
 - Prozessdaten zum Kühlgeräterecycling: eigener Großversuch in Planung
 - Stoffe bei der “Kreisschließung” verfolgen, z.B. Polystyrol Rezyklate
- Bewertungsmodelle auf Mikro- und Makroebene koppeln

Geschäftsmodelle - Transitionspfade

- **Rechtliche Rahmenbedingungen:** Handlungsspielräume und Zielkonflikte prüfen



Vielen Dank für Ihre Aufmerksamkeit

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