

CESA 24 Vienna

Circular Economy beyond recycling – a crucial building block for our future

Prof. Dr. Ing. Manfred Renner

- Head of Fraunhofer UMSICHT
- Head of Fraunhofer Cluster of Excellence Circular Plastics Economy
- Chairholder Ruhr University Bochum



2018/19 CIRCULAR PLASTICS ALLIANCE BRUSSELS

2020/21 ACATECH – CIRCULAR ECONOMY INITIATIVE GERMANY

2023/24 NKWS – »TOP-LEVEL TALKS« FEDERAL ENVIRONMENT MINISTER LEMKE

2023 TRANSFORMATION ALLIANCE OF THE FEDERAL CHANCELLOR

IS THERE ONE ANSWER TO THE
PRESSING QUESTIONS OF THE FUTURE?

WE DON'T HAVE TO CHANGE OUR LIFESTYLE
BECAUSE TECHNOLOGICAL DEVELOPMENTS
SOLVE ALL OUR PROBLEMS!

Fraunhofer UMSICHT

Pioneering the way to a sustainable world



2 locations (Oberhausen, Sulzbach-Rosenberg)
620 + staff
70 million € + operational budget

Four research topics

Sustainable restructuring of economy and society: circular, climate-neutral, economical



Circular Economy

Materials and processes for the circular use of resources: from laboratory to industrial scale



Carbon Management

Sustainable use of carbon



Green Hydrogen

Materials and processes for the electrochemical production, utilization and storage of green hydrogen



Local Energy Systems

Concepts and technologies for transforming the energy supply of districts and industry

100 billion tons
extraction per year

The Circularity Gap Report 2023

Degree of circularity | 7.2 %

The Circularity Gap Report 2023

Starting position



Source: European Commission (2020)

Circular Economy Action Plan

For a cleaner and more competitive EU



Kirchherr et. al (2017)

Conceptualizing the circular economy: An analysis of 114 definitions

A circular economy describes an economic system based on business models that replace the concept of "end-of-life" by reducing, reusing, recycling, recovering materials in production/distribution and consumption processes [...] with the aim of achieving sustainable development [...] for the benefit of present and future generations.

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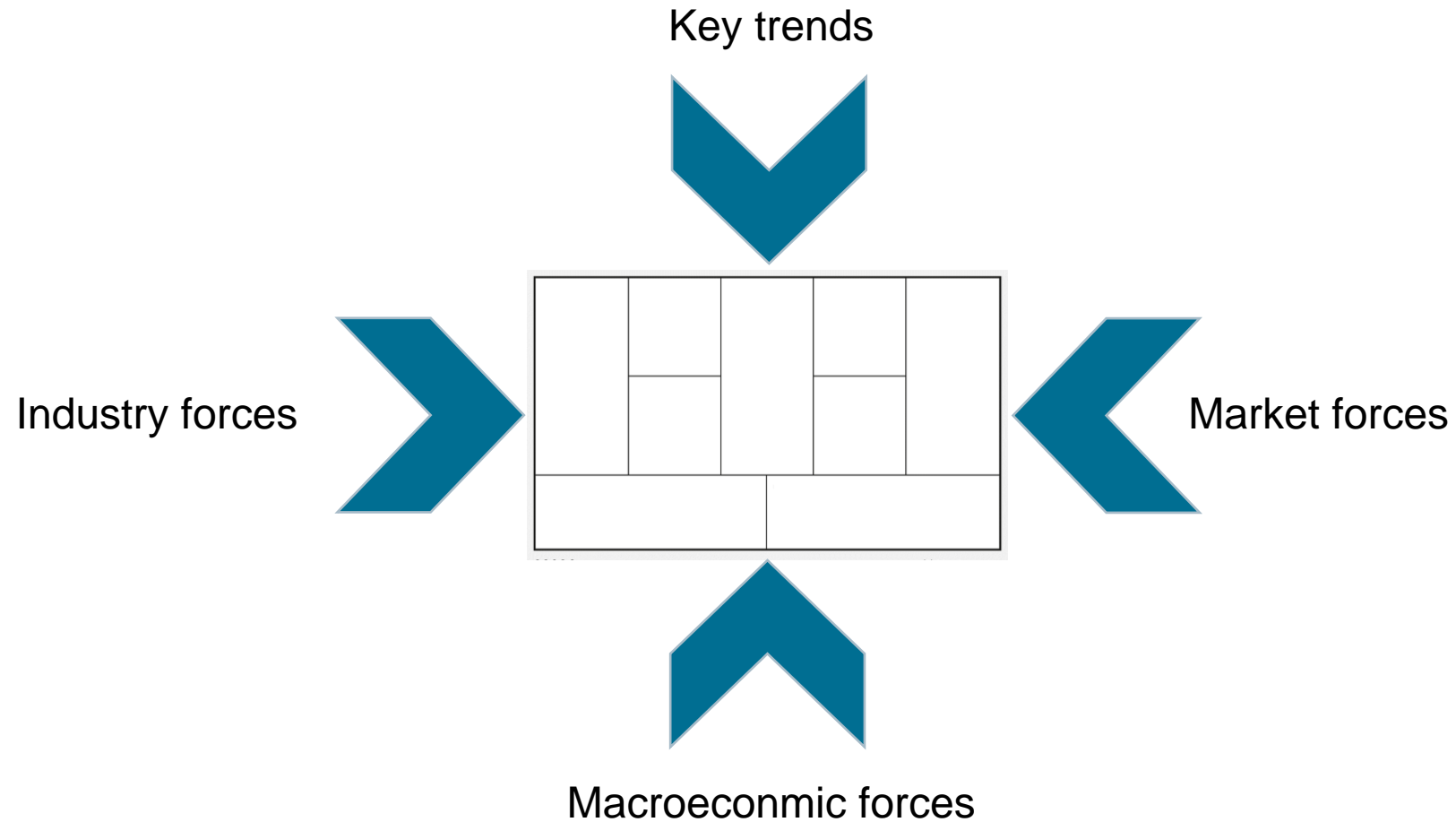
But how?

Business model, status quo and circular challenge



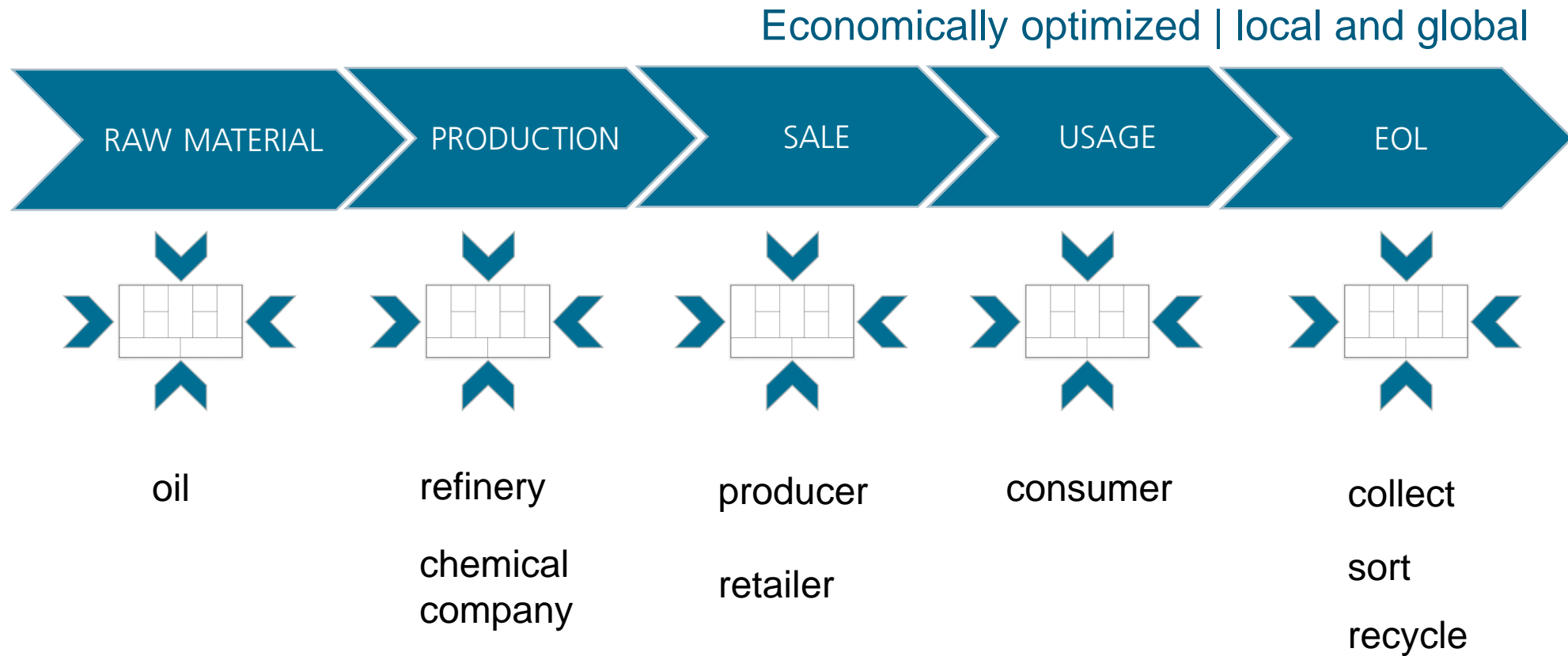
Transformation of business models

First step: Business model CANVAS



Transformation of business models

Second step: defining linear value chains

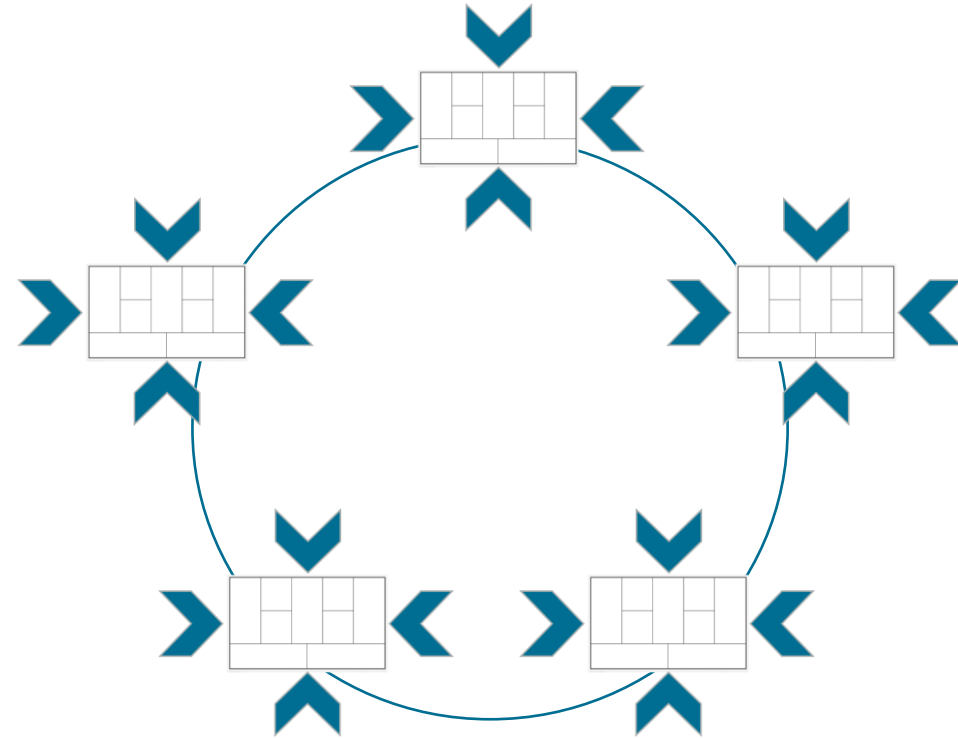


Transformation of business models

third step: 10 R strategies -> circular! – but how?!



Reduce Repair
Rethink Refuse
Reuse Repurpose
Recycle Recover Remanufacture
Refurbish



Status quo: one seat – 15 materials

Hard to repair, hard to recycle



100 components
15 materials
13 kg

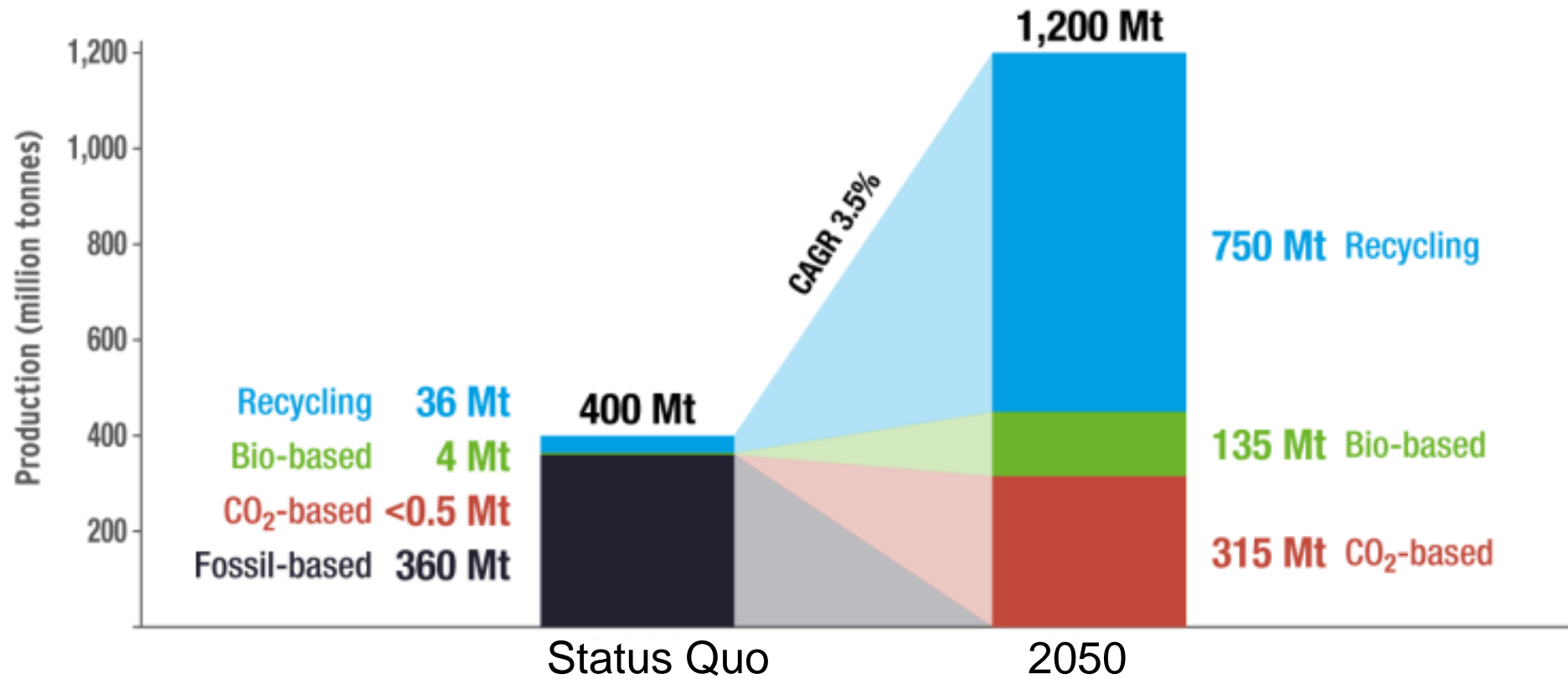


A circular economy needs other solutions!

80% of the environmental impact and costs of a product
are determined by the design

Why bio-based polymers?

Nova-institute scenario 2050 (in million tonnes)



Source: Kähler, F.; Porc. O.; Carus, M. (2023): RCI Carbon Flows Report, report by the Renewable Carbon Initiative RCI, second edition, May 2023

Design concept »Circular seat«

Products change | business models change

Simple disassembly - modular design - new business models - new consumer behavior
"Return, refurbish & resell" instead of "buy & dispose"



Renderings 1-3: Child seat designed by Fraunhofer

Fraunhofer research: mono material for a maximum freedom of design

Biobased polymer
PLA

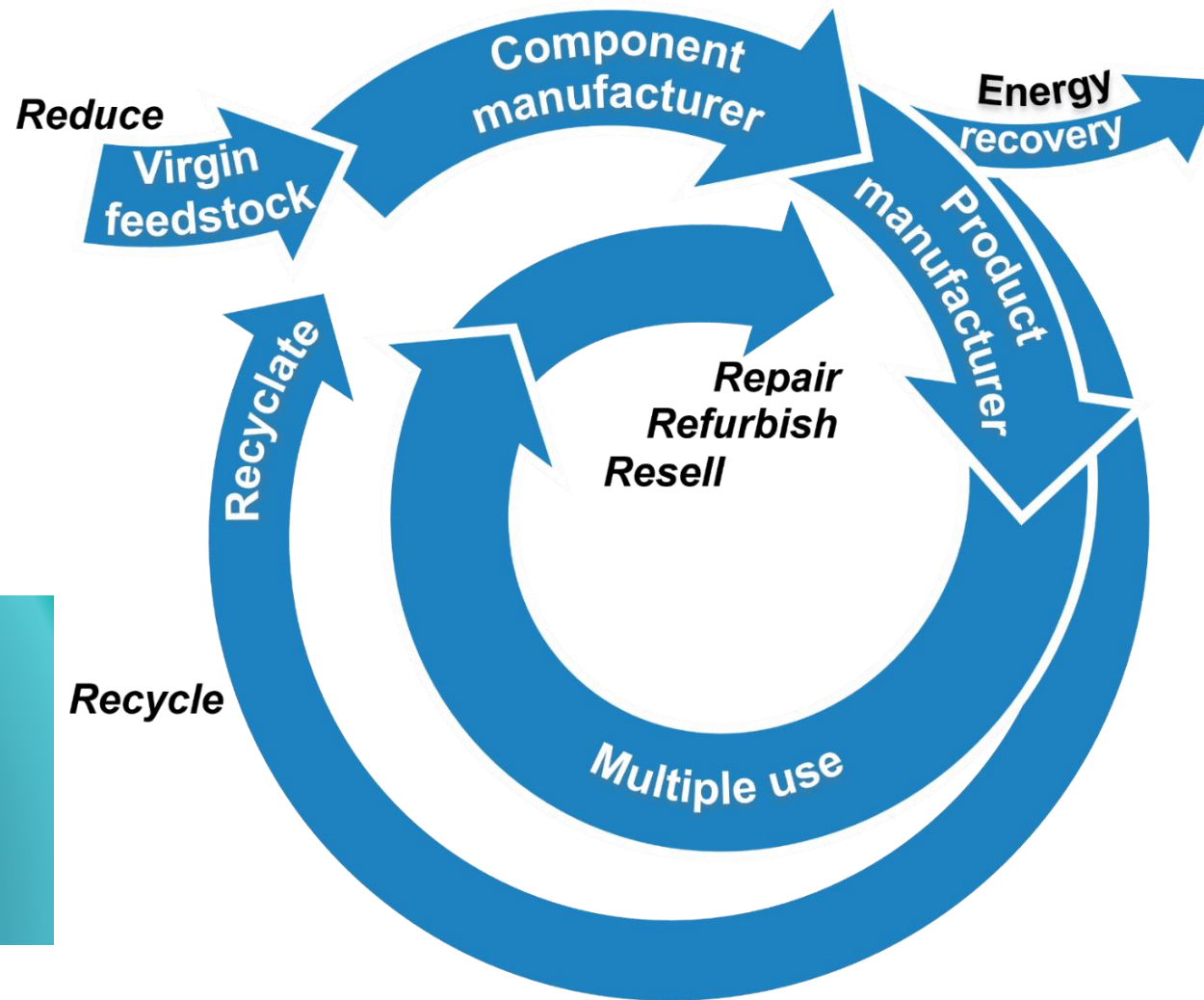


Developed for
100 % recycling



Developing new business logic

Circular value creation



New business models
along the circular value
chain

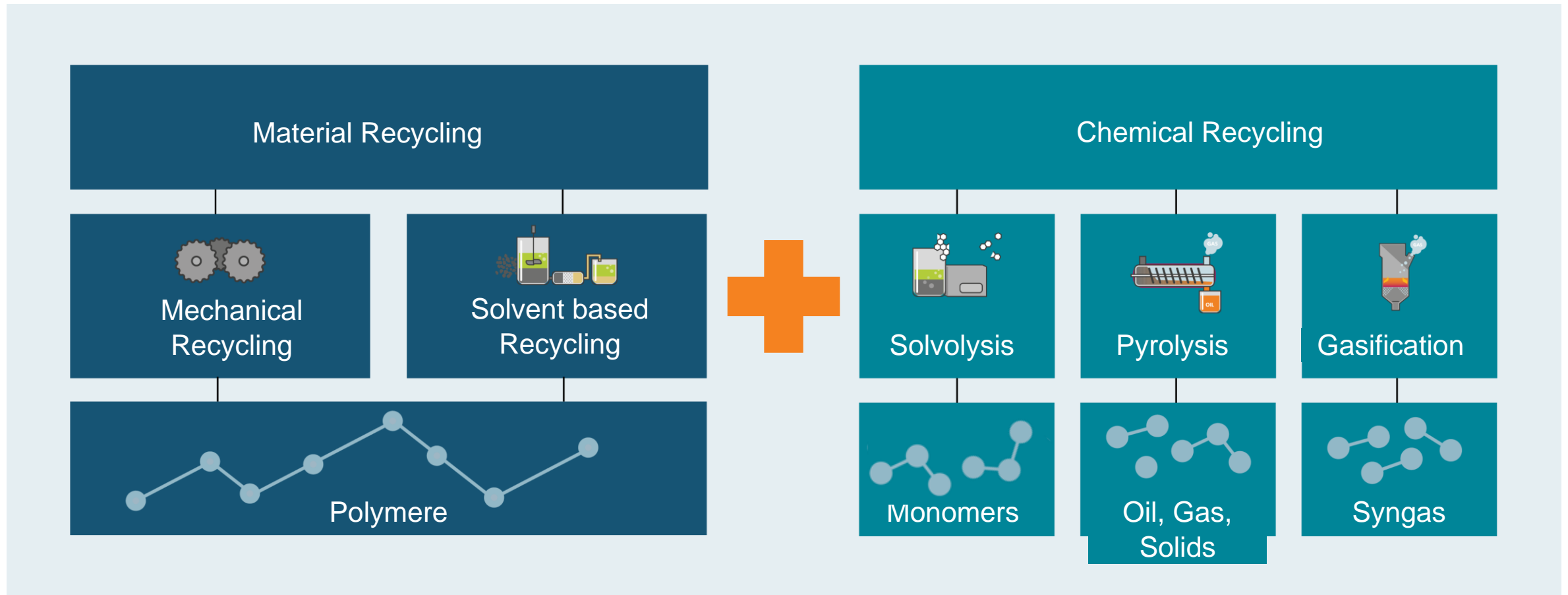
R-Strategies

Recycle

Reduce **Repair**
Rethink **Refuse**
Reuse **Repurpose**
Recycle **Recover** **Remanufacture**
Refurbish

Plastics Recycling – Closing the Loop

Mechanical **AND** chemical!





Fraunhofer
UMSICHT

GERÖPRT VOM
Bundesministerium
für Bildung
und Forschung



iCycle®
intelligent composite recycling

Demonstrator thermo-chemical Recycling

Recycling of plastics and composites

Which lever is rarely discussed?

Which lever is rarely discussed?

Consumption

Thank you for your attention
