Biotechnology for Plastics

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Covestro

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Covestro – leading in the world of plastics

Strong

- €15.9 bn in sales
- ~17,900 employees[1]

Useful

- Plastics, pre-products and solutions
- For many industries

Global

- 50 production sites globally
- Close to customers and partners

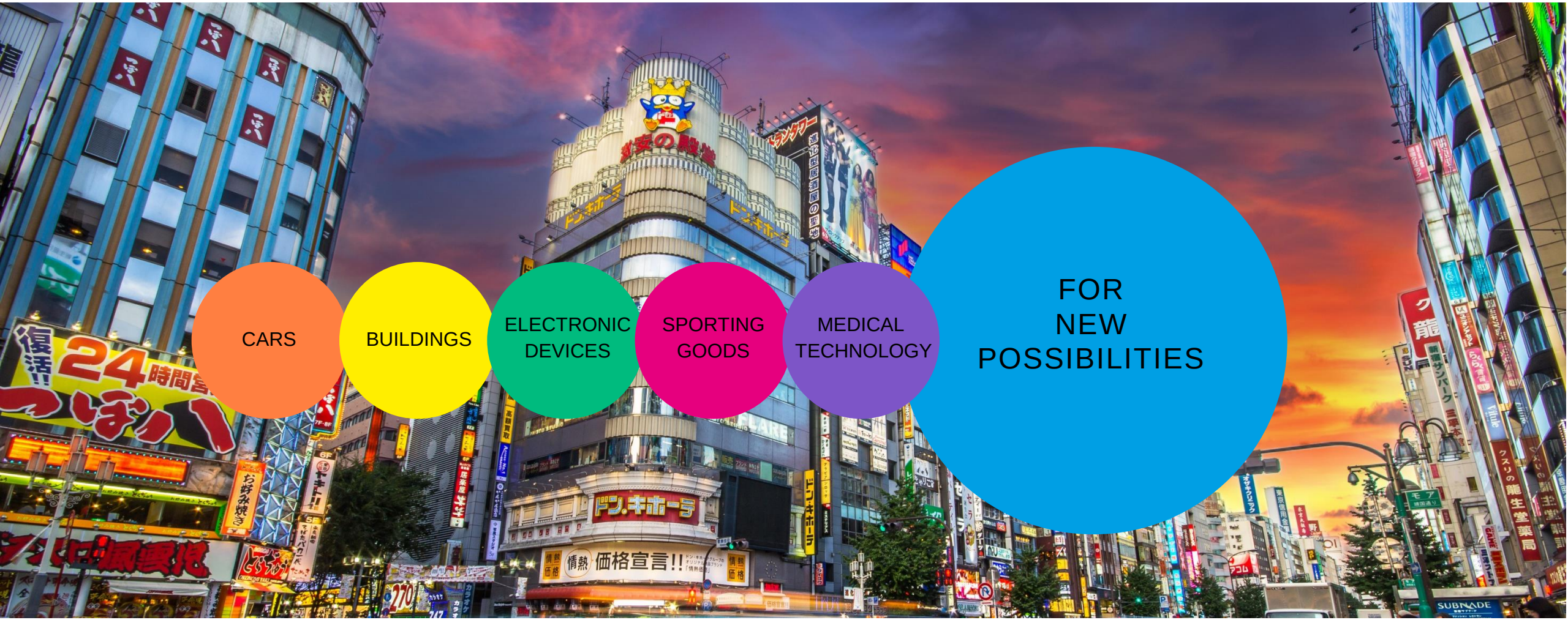
Innovative

- ~1,500 employees in research and development
- 80 years of ideas and inventions

Information is based on financial results for 2021, except amount of employees and amount of global production sites. Those are as of June 30, 2021.
[1]calculated as full-time equivalent (FTE)

Plastics

Enabler of todays modern life



… and essential to drive sustainability in the future

Innovative solutions for key industries

MOBILITY

Less weight

Lightweight construction helps save fuel and enhance e-mobility

RENEWABLE ENERGY

Higher yield

New composites help wind energy to become more efficient

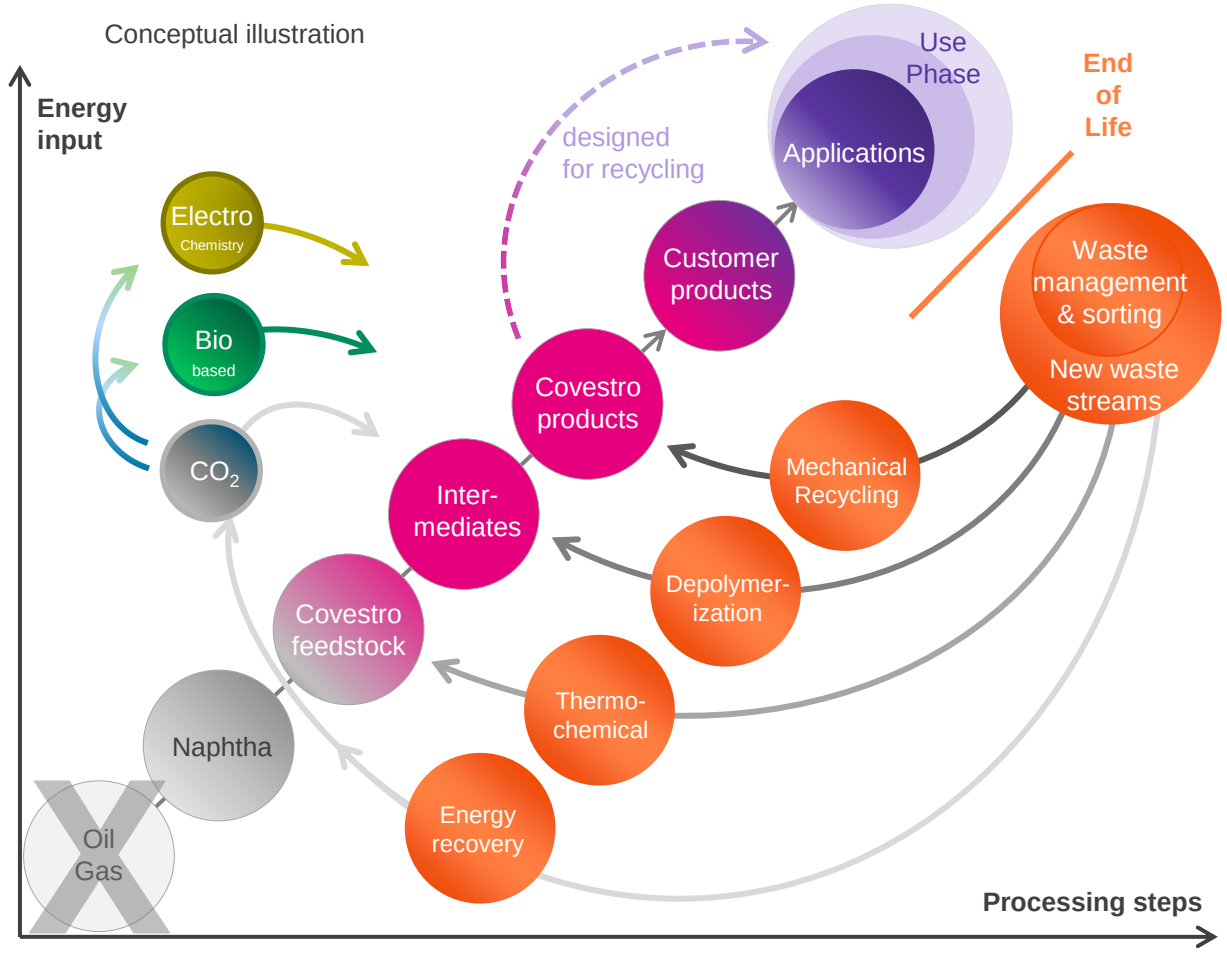
CONSTRUCTION

Better insulation

Insulating foam helps save energy in buildings and cooling devices

Our vision: we will be fully circular

Closing material and carbon loops for a circular economy



COVESTRO APPROACH TO CIRCULARITY

1. Renewable energy

2. Alternative raw materials

3. Innovative recycling for end-of-life solutions

Notes: Shown recycling technologies and energy recovery are illustrative examples only

Bio-based high-tech

Alternative raw materials already in many end products

Covestro has long been producing
plastic components based on bio-based raw materials

The company continues to bring bio-based and recycling innovations to the market

Desmodur®
High quality coatings

Bayhydur®
Furniture coating based on renewable raw materials

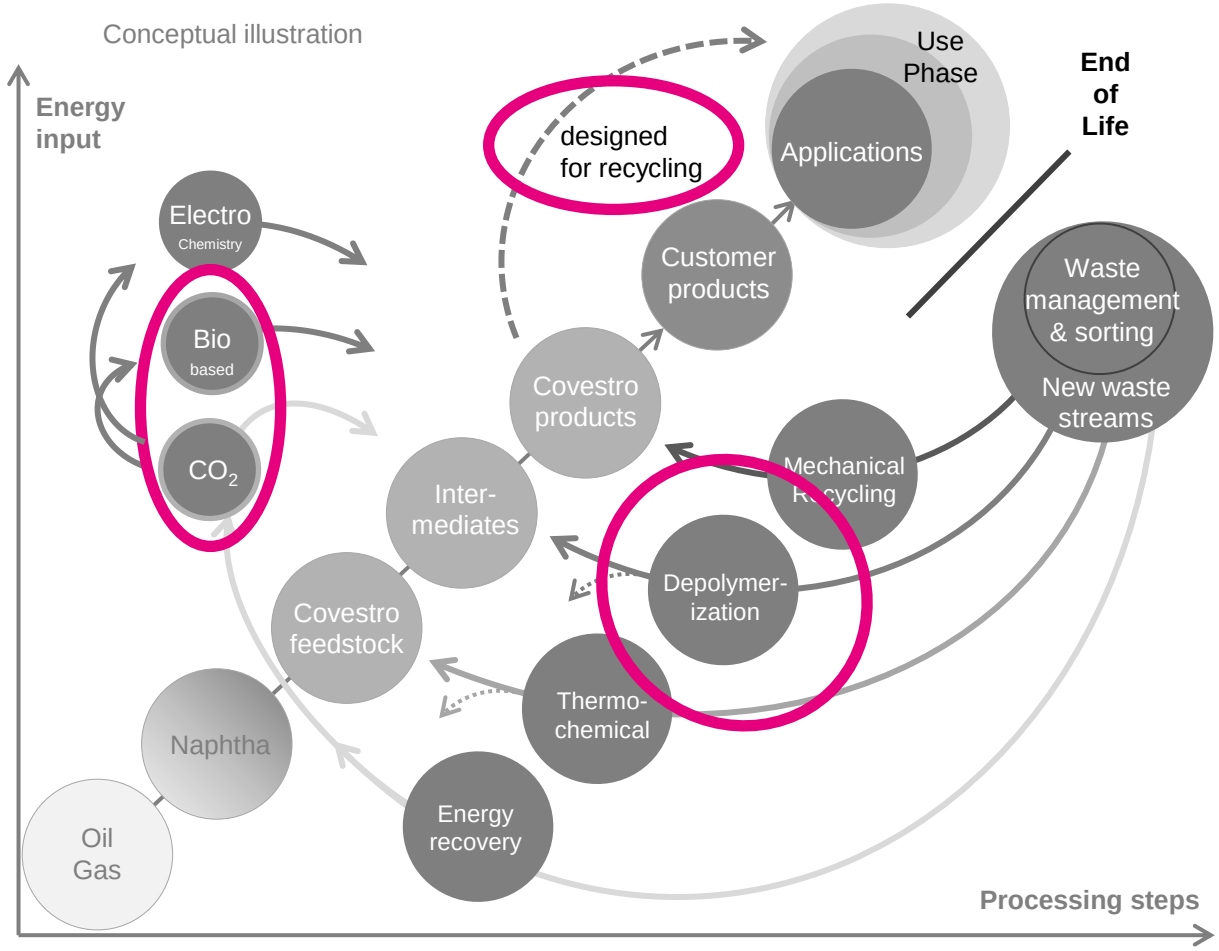
Makrofol®
The first partially bio-based polycarbonate film

Desmopan®
Thermoplastic polyurethanes (TPU) for footwear

Impranil®
For the production of low VOC synthetic materials

Biotechnology is part of the circular transformation

Several more developments within R&D stage



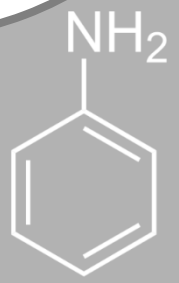
Biotechnology is part of the solution

Notes: Shown recycling technologies and energy recovery are illustrative examples only

Example: Biotechnology to produce Aniline from **Biomass**

Usually based on crude oil

Traditional WAY

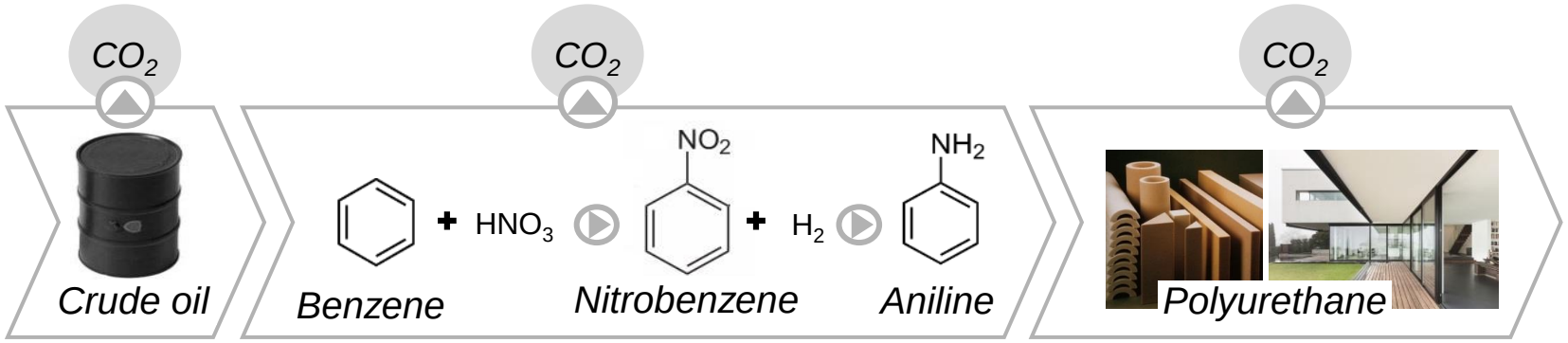


Strategic raw material for the chemical industry

Aniline usually based on fossil resources like crude oil

COVESTRO uses ca. 1 million tons per year = 20% of global aniline consumption

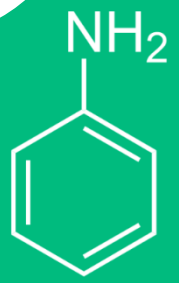
Usage: for polyurethane foam to insulate buildings and cooling devices



Example: Biotechnology to produce Aniline from **Biomass**

Producing aniline from wood, straw or field corn

THE NEW WAY



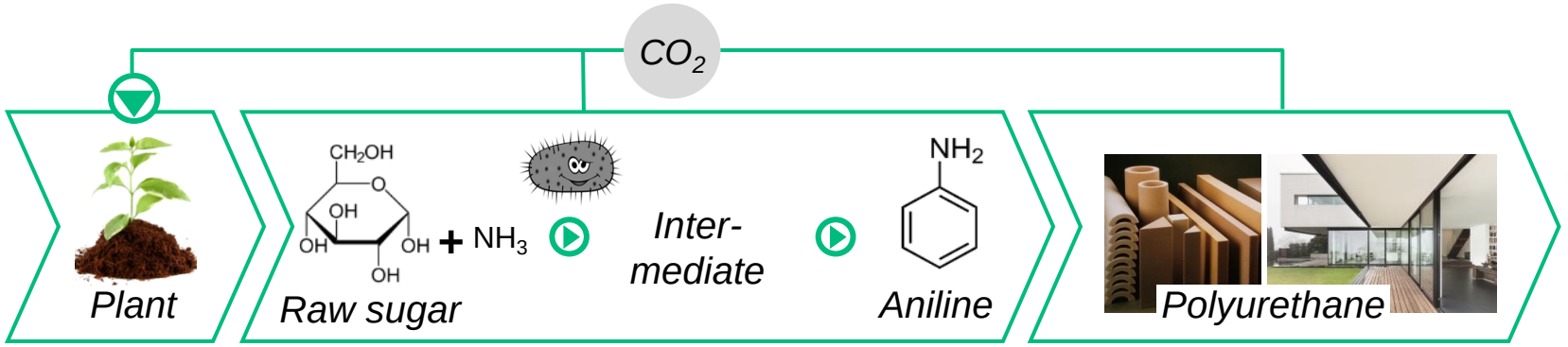
COVESTRO can produce aniline without using fossil raw materials

Saving fossil resources for future generations

100 % biobased aniline

Significant **reduction** of CO_2 emissions

Successful scale-up to larger scale

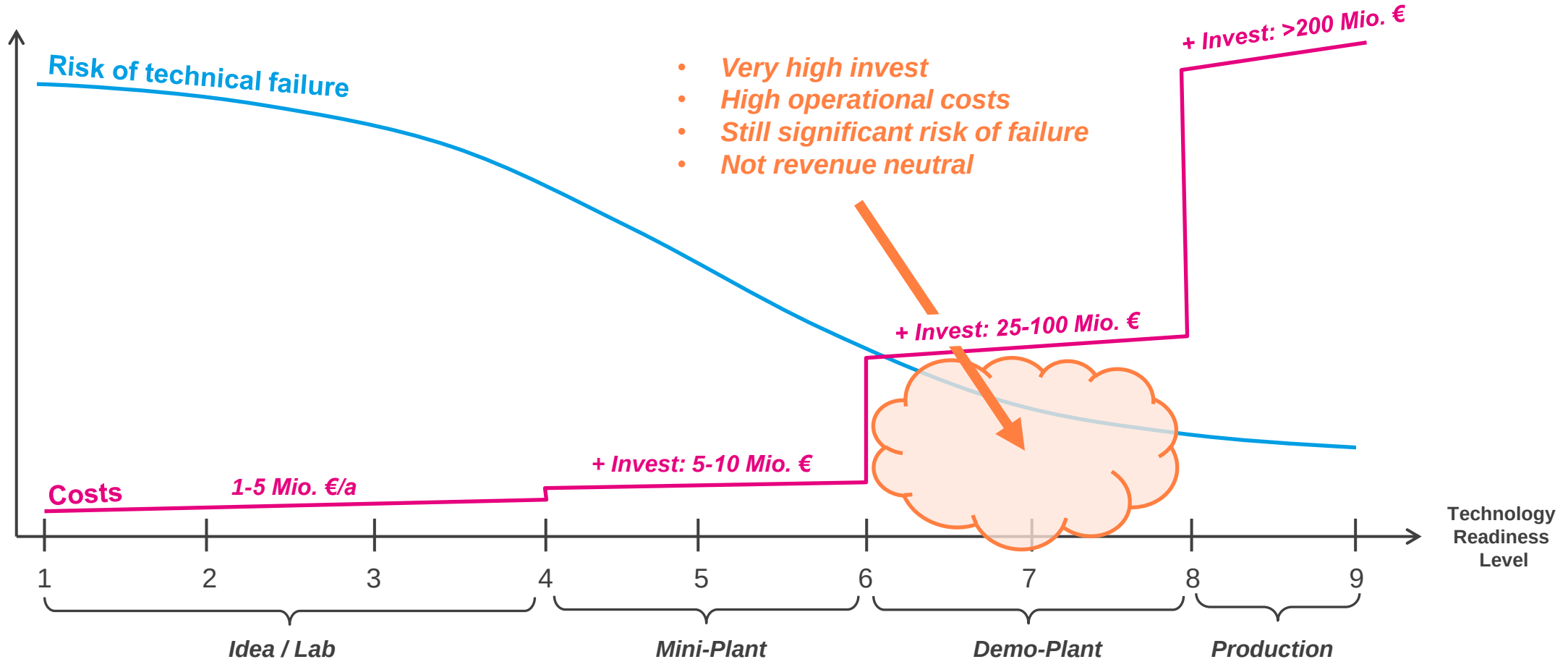


50 MOST INNOVATIVE COMPANIES
Technology Review
Deutschland Land der Ideen

Universität Stuttgart
RWTH AACHEN UNIVERSITY
covestro
FNR Fachagentur Nachwachsende Rohstoffe e.V.
Federal Ministry of Food and Agriculture

Technology Development

Realization is the real challenge



➢ **Tech development requires significant resources. Funding also at later TRLs needed.**

Supporting the transformation

What is needed?

1. **Interdisciplinary collaboration with academia and across-industry**
   … to deliver disruptive solutions

2. **Reliable targets and regulatory framework**
   … to justify significant investments and have freedom of action for such a large transformation

3. **Significant resources in R&D, scale-up and production**
   … accompanied by funding (not only at early technology readiness levels)

4. **Openness towards innovation, infrastructure and chemistry**
   … within society, authorities and industries

5. **Increased availability of alternative raw materials and energies at competitive prices**
   … to finally substitute virgin fossil resources

Thank you for your attention