# Sustainable chemistry in the building sector – important links to resource management

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**UNEP WORKSHOP ON GREEN AND SUSTAINABLE CHEMISTRY IN THE BUILDINGS AND CONSTRUCTION SECTOR**

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N³ Nachhaltigkeitsberatung
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# Green and sustainable chemistry: Special challenges for construction and building

- High amount of materials in buildings (concrete,…)
  - Recycling of used materials urgently needed
- High number of products for construction
  - Products with hazardous substances (occupational health)
  - Risk of indoor air pollution (public health)
- Extremely long use phases (from 30 to > 100 years)
  - Loss of important information, e.g. construction materials
  - Risk assessment of materials can change in the course of time

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- Log life of buildings, but renovation and refurbishment
  - New materials brought in
  - Loss of important information, e.g. construction materials
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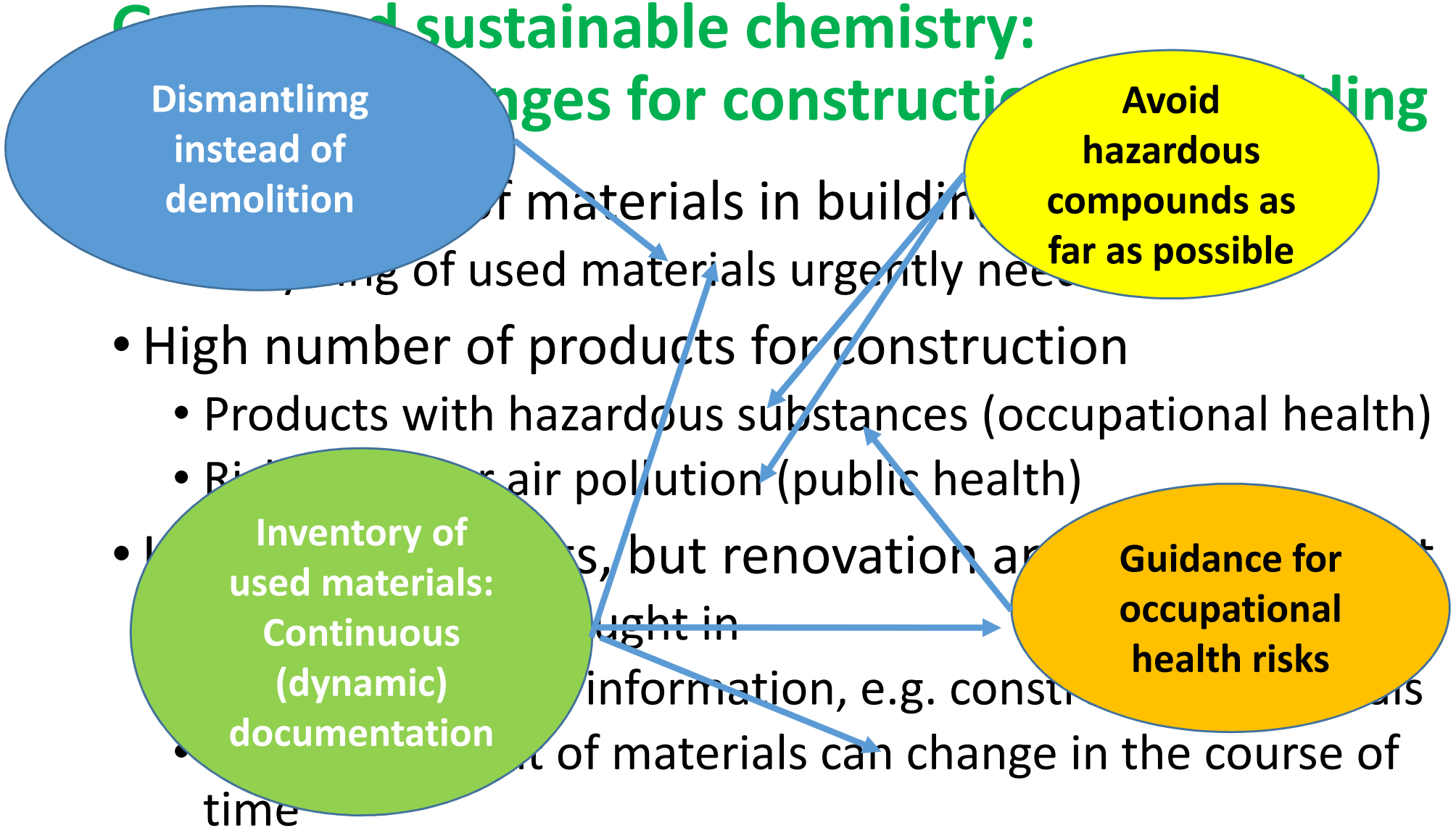


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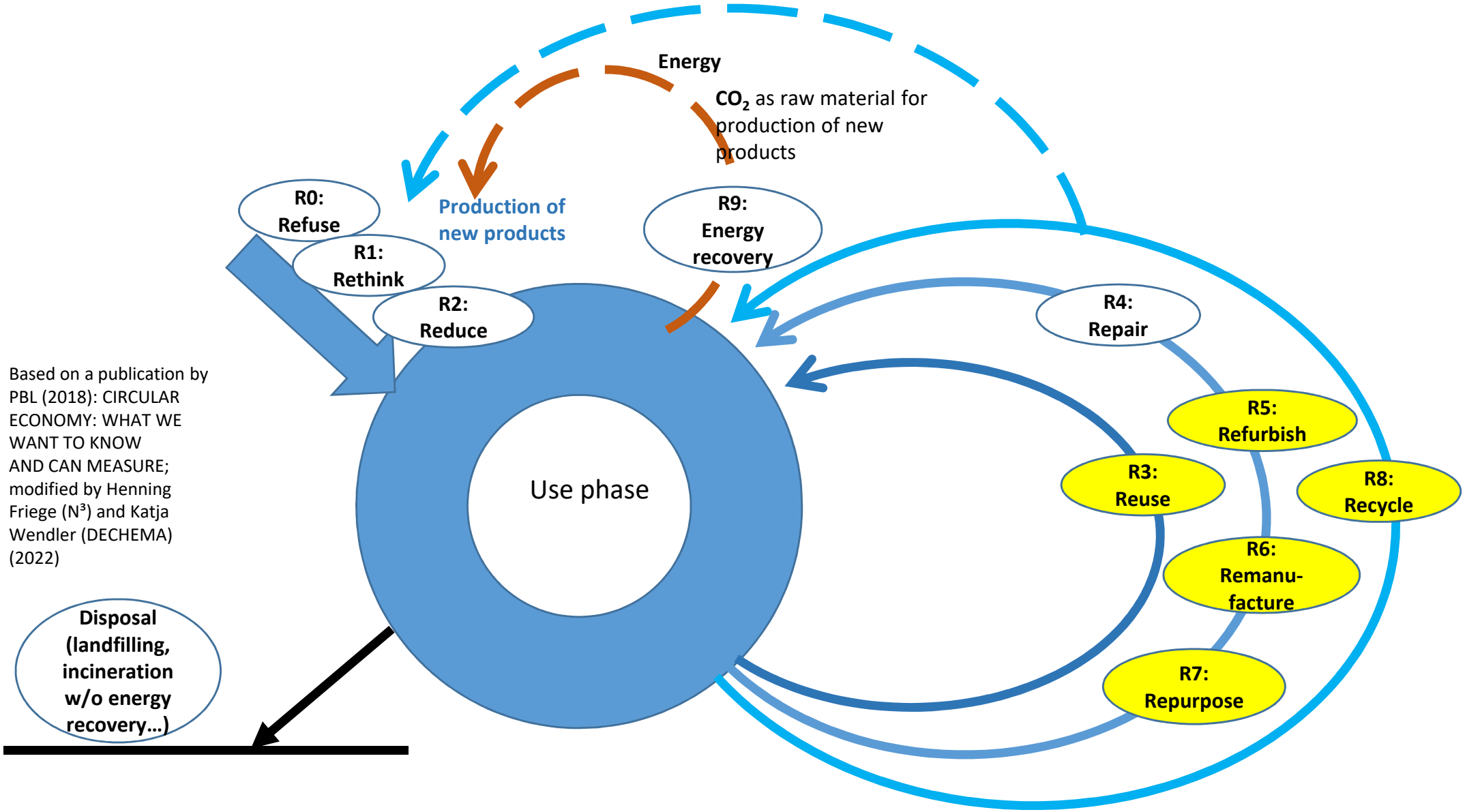


Based on a publication by PBL (2018): CIRCULAR ECONOMY: WHAT WE WANT TO KNOW AND CAN MEASURE; modified by Henning Friege ($N^3$) and Katja Wendler (DECHEMA) (2022)

# Examples of life cycle thinking for sustainable resource use and application of chemicals

| Name / Funding | „R“ stra-tegies | Characterisation of the project | Business as usual option |
|---|---|---|---|
| Sustainable Waste Mgt.*)   | R8,(R3) | Deconstruction of buildings: Optimisation of the value chain for recycling – removal of legal obstacles and enforcement problems for the use of recycled materials in construction | Most recovered material used for infrastructure projects („downcycling“) |
| RePOST[2]   | R7,R8 | Separation of aerated concrete from construction waste for recycling and repurposing processes | Demolition or deconstruction without recovery of aerated concrete |
| RessProKa[3]   | R1,R3,R6, R8 | Product as a service business model for construction products (e.g. interior walls, flooring) | Conventional business in the construction industry (“Build, sell and forget”) |

**Projects performed by: *)** N³ Thinking Ahead / BASIKNET / Akademie Dr. Obladen [2]) Xella / Otto Dörner GmbH/ KIT [3]) IWARU (FH Münster) / BIFAS / Lindner Group

# RessProKA

## Present situation

- **Finishing work** is the most important sector in the resource-relevant construction sector
  - Gernany: approx.136 billion euros construction volume
  - approx. 1.2 million employees
  - 252,000 companies
- **Building products like technical flooring, interior walls have shorter life cycles (≤ 10 years) than e.g. shell construction**
  - Change of user, changing needs of users
  - due to design aspects,
  - technical modernization,
  - changed space utilization and concepts


[2]

# RessProKA

## Targets and challenges

- **Closing of loops** for volume-relevant building products of interior design
  - Optimisation of the technical cycle
- **Development of a business model**
  - Manufacturers assume "product responsibility" over the entire life cycle of their building products
  - Manufacturers may remain owners and are responsible for the return and remanufacture or recycling of their products after use.
- **Systemic approach**
  - Enables conceptual and instrumental transfer of the developed model to other building products.

The project was finalized in 2022. Pilot projects by the industrial partner are under development. More information: https://innovative-produktkreislaeufe.de/Projekte/RessProKA.html



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# Benefits with respect to the Green and Sustainable Chemistry Objectives

- Accurate documentation of construction materials being available for the life cycle of the building (-> “BIM” building information management)
  - “Maximizing social benefits” (No 8)
- Risk prevention with respect to materials and products used for building purposes
  - “Minimizing chemical hazards” (No 1)
- Less material used, less energy consumed, less GHG emissions, less waste
  - “Enabling non-toxic circularity” (No 7), “Sustainable sourcing of resources and feedstocks” (No 2)


**N³ Thinking Ahead Dr. Friege & Partners**

**www.N-hoch-drei.de**