VDI Zentrum Ressourceneffizienz

Im Auftrag des:
Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit

NATIONALE KLIMASCHUTZ INITIATIVE


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# Raw Material Challenges for SMEs

**Maximilian Müller**
VDI Centre for Resource Efficiency (VDI ZRE)

Madrid, 14 February 2019

# The Association of German Engineers (VDI)

## VDI e.V.

over 150,000 members,
over 12,000 volunteers

12 Societies & 60 Divisions 

About 200 new and revised VDI guidelines per year 

Training & Education 

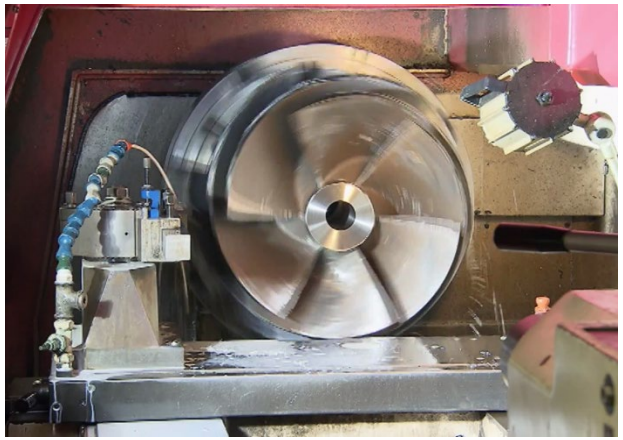
VDI

## VDI Group

- Innovation Funding
- Technology Consulting
- Media
- Advanced Training

# VDI Centre for Resource Efficiency (VDI ZRE)

- Project on behalf of the Federal Minister for the Environment, Nature Conservation and Nuclear Safety (BMU), funded by the National Climate Fund
- Focus on Resource Efficiency in operational practice through connection to VDI
- Competence Centre for demand-driven preparation of technical knowledge on Resource Efficiency in SMEs
- Development of standards through VDI guidelines for RE in cooperation with VDI



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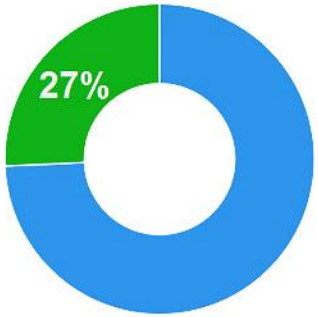
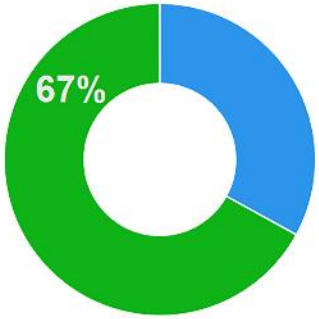
# What do SMEs think about Resource Efficiency?

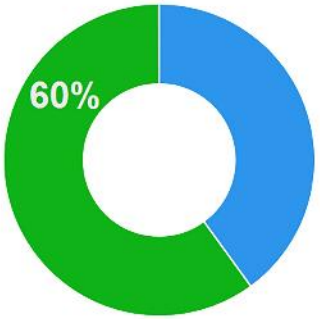
*Within our industry all potentials are already released.*



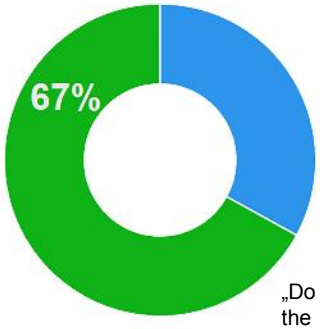

*Resource efficiency is part of our business strategy.*




*Resource efficiency is of great importance to my customers.*



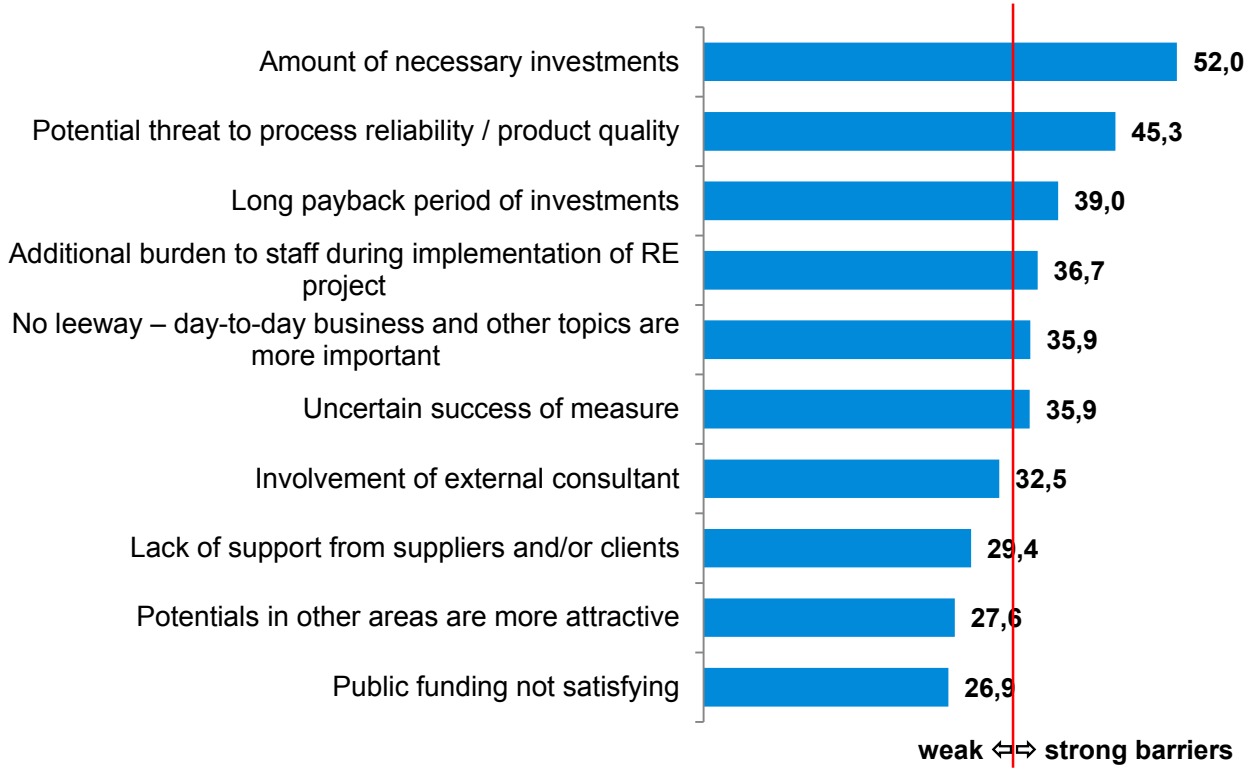

*Resource efficiency is discussed within my industry / among my competitors.*




„Do you agree with the following question?“; Answers in percentage of total; $n_{ug}$ = 1.007

- SMEs identify resource efficiency as increasingly important
- However, most potentials are not released yet
- Further implementation of resource efficiency measures in practice, with special focus on SMEs

# Barriers for Implementing Resource Efficiency




6 of 10 aspects can be identified as strong barriers.

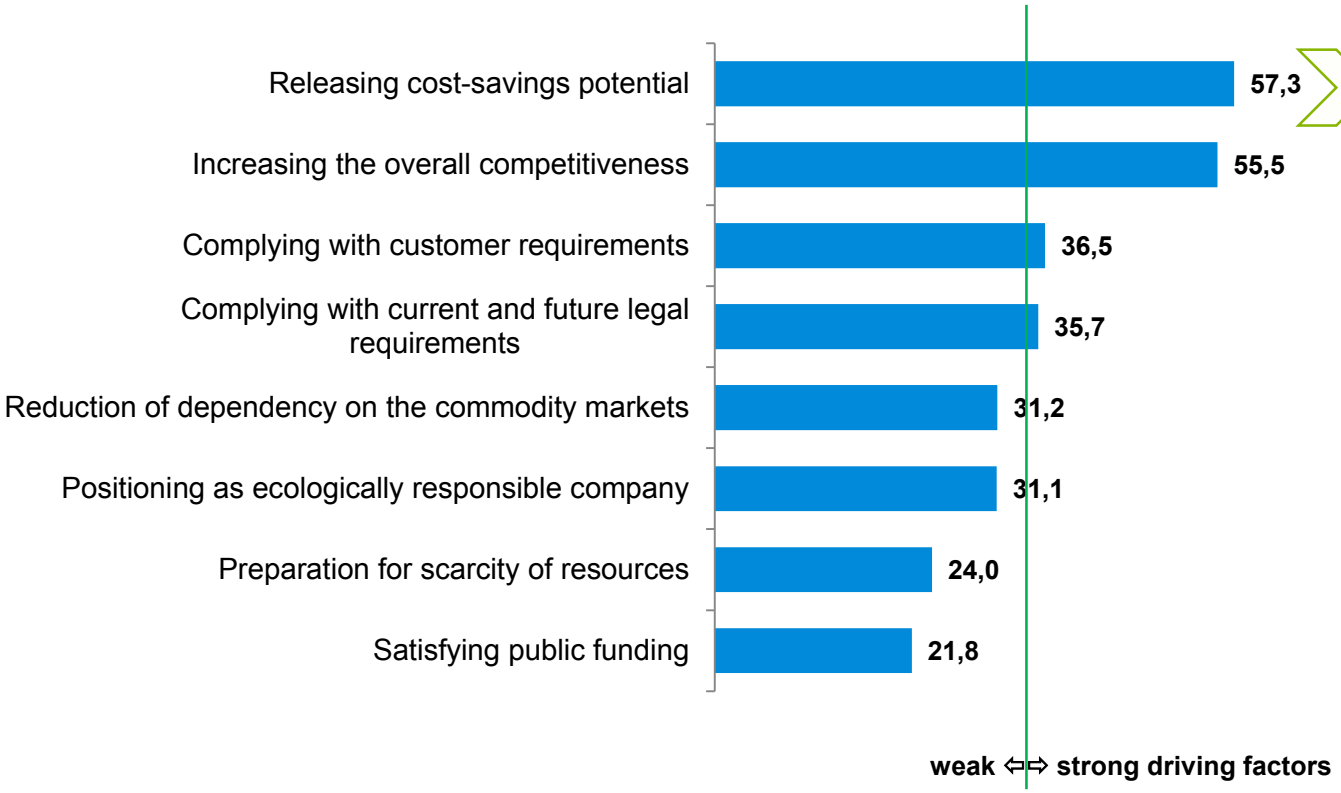
Economic aspects are dominating barriers.

Investment level can be seen as very strong barrier.

Answers in relevance points from 1 to 100; multiple answers possible;
$n_{ug}$ = 1.007

Source: VDI Centre for Resource Efficiency (VDI ZRE), 2015: Studie Status quo Ressourceneffizienz; www.ressource-deutschland.de/publikationen/studien

# Driving Factors for Resource Efficiency




4 out of 8 driving factors can be identified as strong.

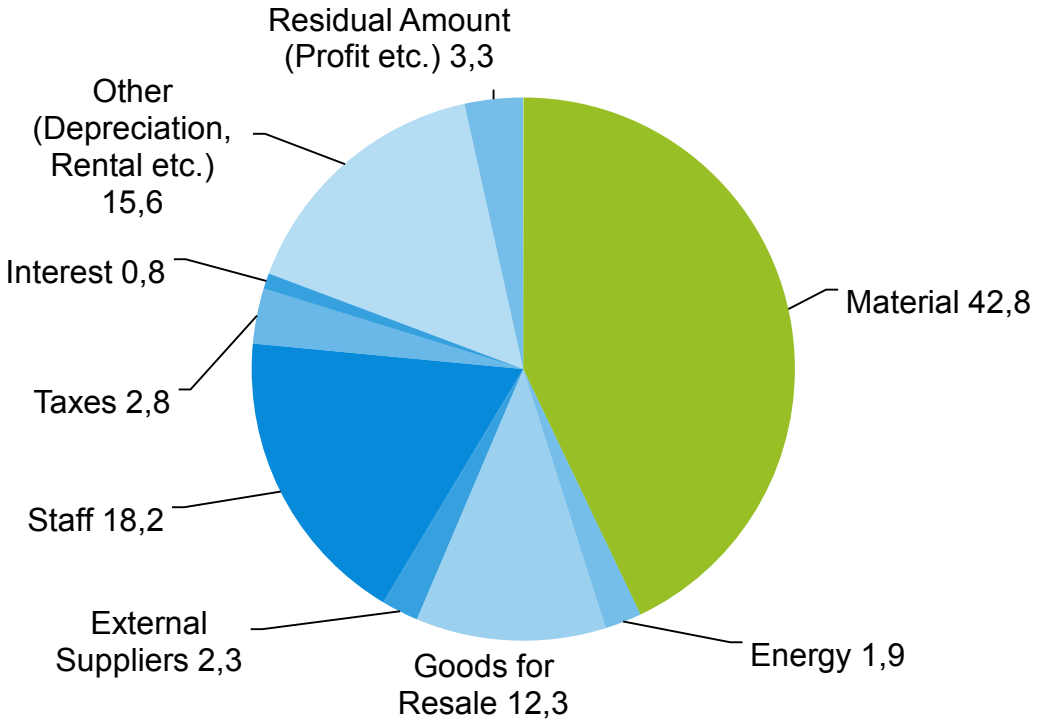
Both top ranking driving factors refer directly to business-oriented thinking and decision making.

Answers in relevance points from 1 to 100; multiple answers possible;
$n_{ug}$ = 1.007

Source: VDI Centre for Resource Efficiency (VDI ZRE), 2015: Studie Status quo Ressourceneffizienz; www.ressource-deutschland.de/publikationen/studien

# Business perspective on Resource Efficiency

## Cost Structure in Manufacturing Industries

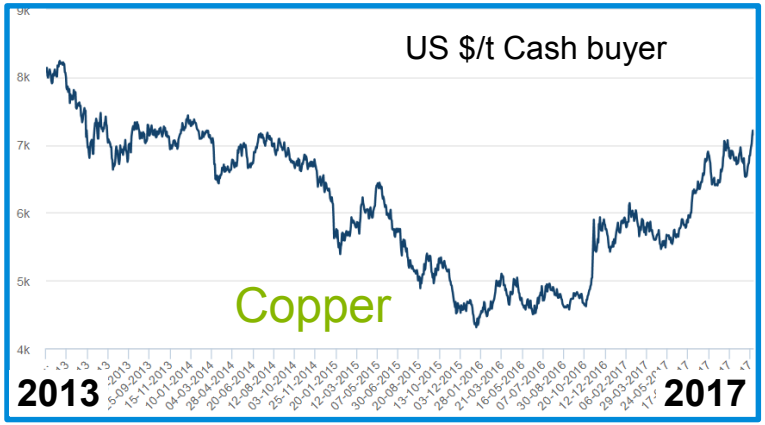


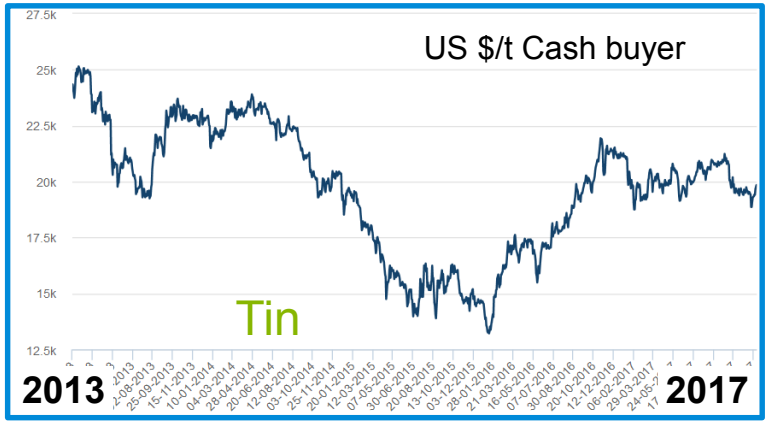

- Materials
  - Semi-finished products
  - Components
  - Assemblies
    - Raw materials
    - Energy
    - Staff
    - etc.

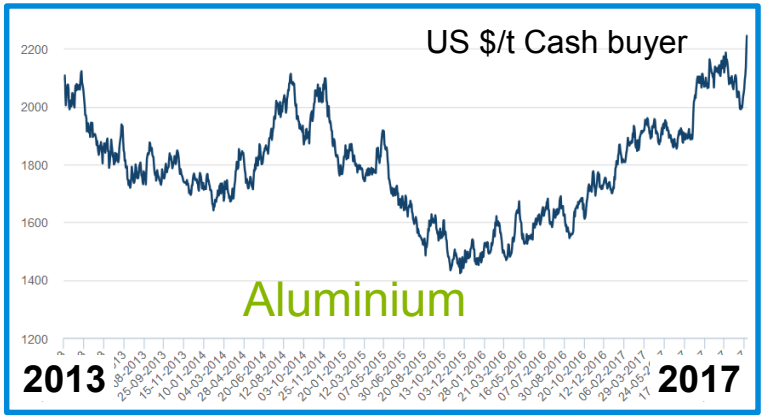
*Gross production value = 100%*

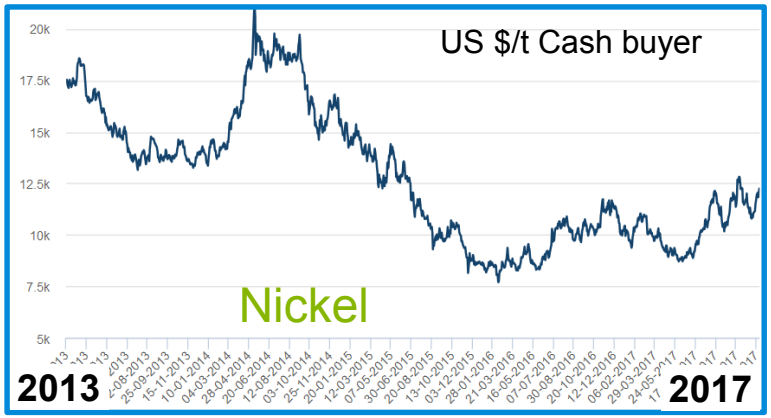
*Source: Statistisches Bundesamt (2016)*
*Zahlen für das Jahr 2015*

# Development of Selected Raw Material Prices



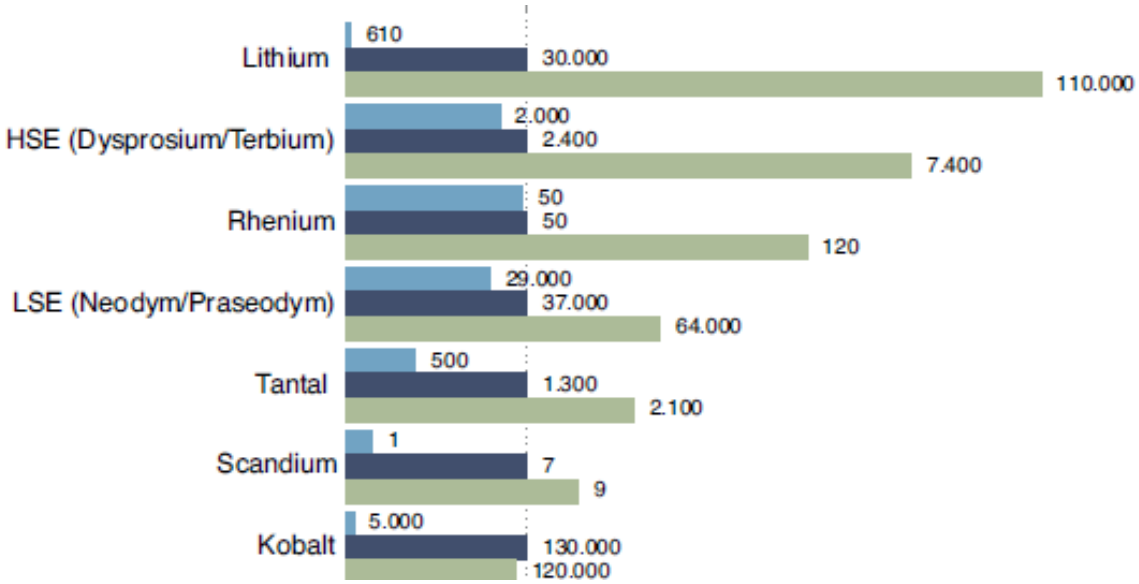



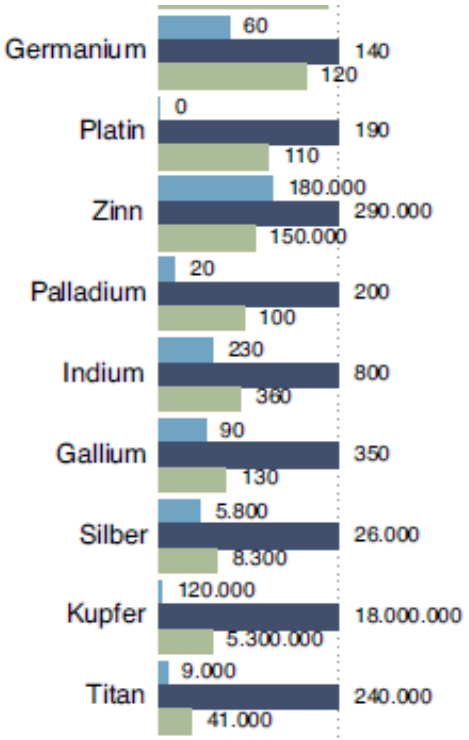

*Source: London Metal Exchange www.lme.com (2018)*

# Raw Materials for Future Technologies

**Demand for future technologies 2013 / t**
**Production 2013 / t**
**Demand for future technologies 2035 / t**

*Bar length standardised to the annual production in 2013*



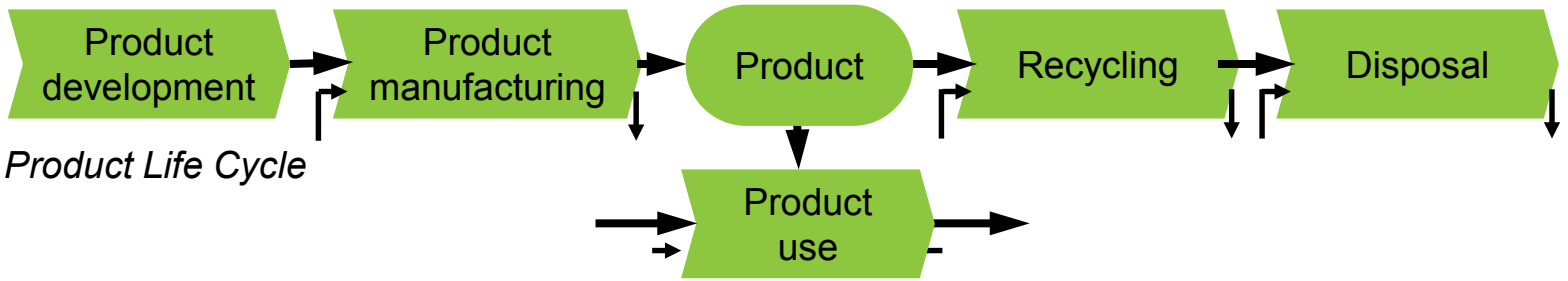




*Source: DERA-Studie Rohstoffe für Zukunftstechnologien/ Fraunhofer-Institut für System- und Innovationsforschung ISI (2016)*

# Strategies to Increase Resource Efficiency

## Resource Efficiency Analysis

- Consideration of the whole **Product Life Cycle**




The digital transformation bears considerable potential for resource efficiency in the whole product life cycle.

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# Case Studies: Resource Efficiency 4.0

RESOURCE
GERMANY.TV

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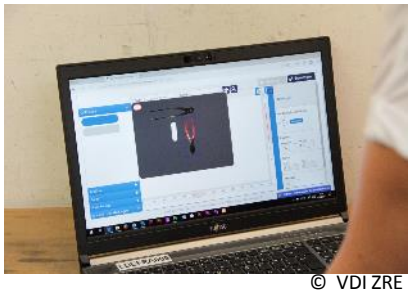
One Piece Flow
(Manufacturing)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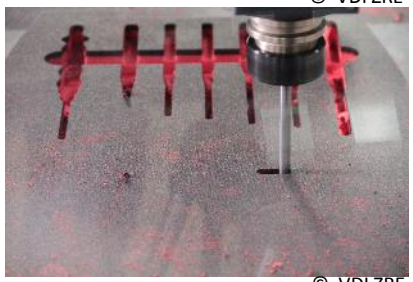
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Foam Packaging
(Product Design)


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Smart Iron Foundry
(Manufacturing)


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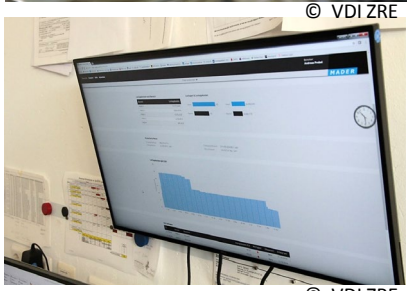
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Compressed Air
Leakage App
(Production Infrastructure)

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# Case Studies: Resource Efficiency 4.0

RESOURCE GERMANY.TV

Savings of

- 2.526 kg EPDM foam per year
- 233 kg aluminium profile per year
- Total of 16.000 kg CO2eq per year

One Piece Flow (Manufacturing)

Savings of

- 25.000 kg PE Foam per year
- 7.000 kg CO2eq per year

Foam Packaging (Product Design)

Savings of

- 85.000 kg CO2eq per year
- 243.600 kWh of electricity per year
- € 45.800 energy costs per year

Smart Iron Foundry (Manufacturing)

Savings of

- 123.000 kg CO2eq per year
- 231.000 kWh of electricity per year
- € 35.000 energy costs per year

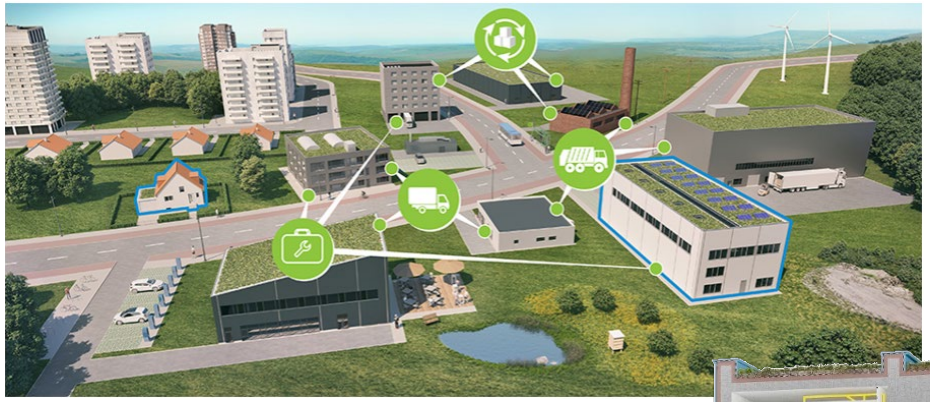
Compressed Air Leakage App (Production Infrastructure)

# European Resource Efficiency Knowledge Center

EREK European Resource Efficiency Knowledge Centre

# The EREK Network

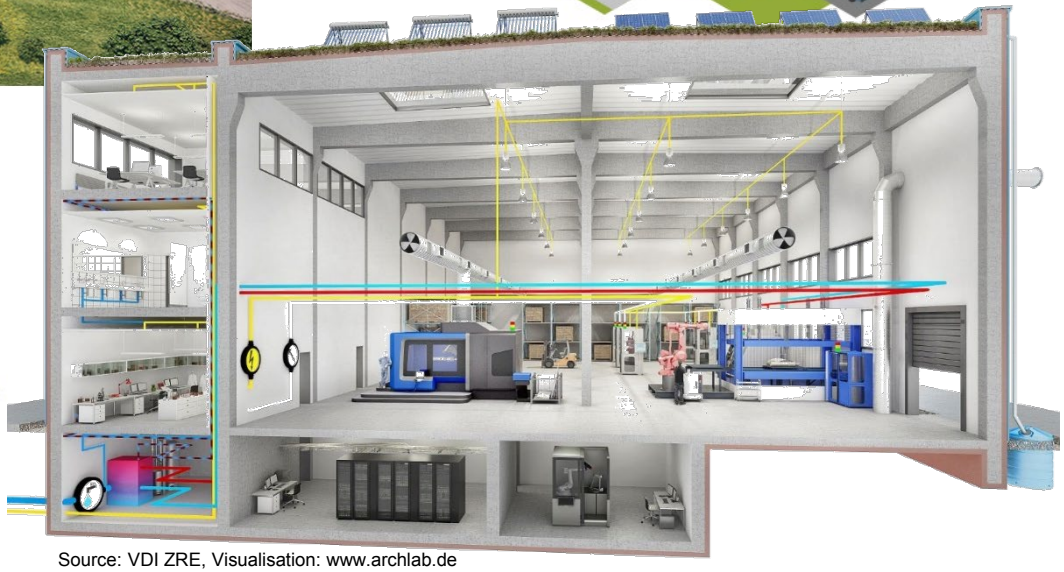
# Tools and Good Practice Examples



Source: VDI ZRE, Visualisation: www.archlab.de

Source: EREK

Source: EREK



Source: VDI ZRE, Visualisation: www.archlab.de

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