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INSTITUTE FOR
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Baden-Württemberg

MINISTERIUM FÜR UMWELT, KLIMA UND ENERGIEWIRTSCHAFT

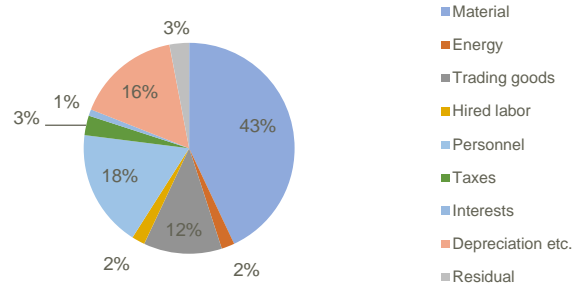
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L75 17001

Why does material
efficiency stay in the
shades of energy
efficiency?

Resource efficiency in the industry – raising awareness



COST STRUCTURE OF MANUFACTURING INDUSTRY



Resource efficiency:

Increasing attention and importance

Baden-Württemberg:

- Innovative and economically strong region with high share of GDP stemming from manufacturing industries
- For resident companies the efficient utilization of raw materials is crucial in order to stay competitive

Cost structure:

A focus should be put on material efficiency

Governmental initiative:

Find at least 100 excellent examples from the industry, illustrating measures that increased resource efficiency

Research questions and methods



Drivers and barriers regarding energy efficiency in companies have extensively be studied (e.g. [1],[2],[3]).
The lack of awareness is one of the mentioned barriers.

Aim of the project: Spreading best practice examples among different actors in companies and society

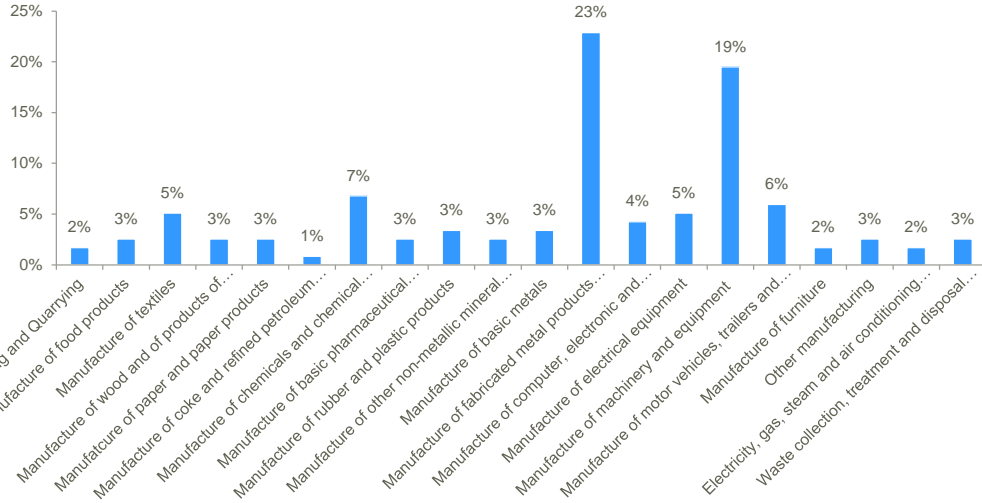


- *What are the barriers prior and during the implementation of resource efficiency measures?*
- *What are the drivers triggering the implementation of a resource efficiency measure?*
- *Do similarities between companies exist, e. g. success factors, that support the implementation?*

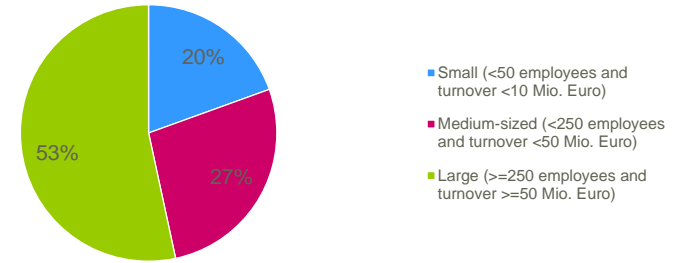
- Comparative case study design of over 100 individual case studies
- Questionnaire using Likert-Scales covering motivation, ability and opportunity as well as knowledge and application of resource efficiency measures



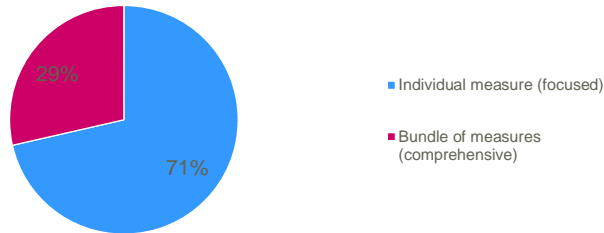
PARTICIPATING COMPANIES BY INDUSTRIAL SECTOR



PARTICIPATING COMPANIES BY SIZE OF ENTERPRISE (EU-DEFINITION)



SCOPE OF THE CASES

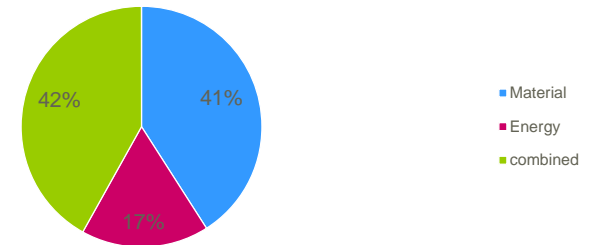


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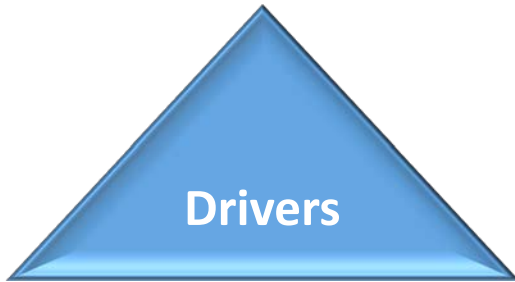
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THE
100
COMPANIES

CASES BY AREA OF EFFICIENCY INCREASE



Preliminary results




- Mostly competitive advantages such as productivity increase or innovation leadership
- Environmental benefits and improved working conditions are either additional drivers or highly appreciated side-effects


- SMEs often lack personnel resources for comprehensive efficiency projects
- Available technology requires adaptation for the particular use case




- Cross-functional and interdisciplinary teams within and beyond the company
- Close collaboration with machinery and equipment manufacturers
- Process mastering and understanding


Conclusions and recommendations


 Resource efficiency measures are useful and beneficial regardless of industry type and company size

 The case studies reveal a strong interlinkage of energy and material usage, or more precisely material efficiency increases serve as a precondition for various energy efficiency improvements

 Material efficiency is often achieved using very specialized techniques, which makes it difficult to define a set of recommendations in contrast to energy efficiency

 Small companies would benefit from consultancy programs

 Cooperation across supply chain should be promoted, an intensive exchange between equipment and machinery manufacturers and operators should be facilitated

 Governments should make it easier for companies to adopt innovative and resource efficient techniques

References

- [1] Blumstein, C.; Krieg, B.; Schipper, L.; York, C. (1980): Overcoming social and institutional barriers to energy conservation, *Energy*, Vol. 5, 355–371.
- [2] Brunke, J.-C. et al. (2014): Empirical investigation of barriers and drivers to the adoption of energy conservation measures, energy management practices and energy services in the Swedish iron and steel industry, *Journal of Cleaner Production* Vol. 84, 509-525.
- [3] Rohdin, P.; Thollander, P. (2006): Barriers to and driving forces for energy efficiency in the non-energy intensive manufacturing industry in Sweden, *Energy*, Vol. 31, 1836-1844.

Pictures:

Slide 1: (from left to right)

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Slide 3:

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Slide 4:

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