REDUCTION OF PRODUCTION COST – POTENTIAL OF PROCESS COST OPTIMIZATION

TASK 54

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Targets of the Project TEWIsol

- Common activity of industry, craft and research targeting **cost reduction** in solar thermal installations
- Approach: **combined economic technical method development for cost reduction** considering the complete value chain starting from development to installation

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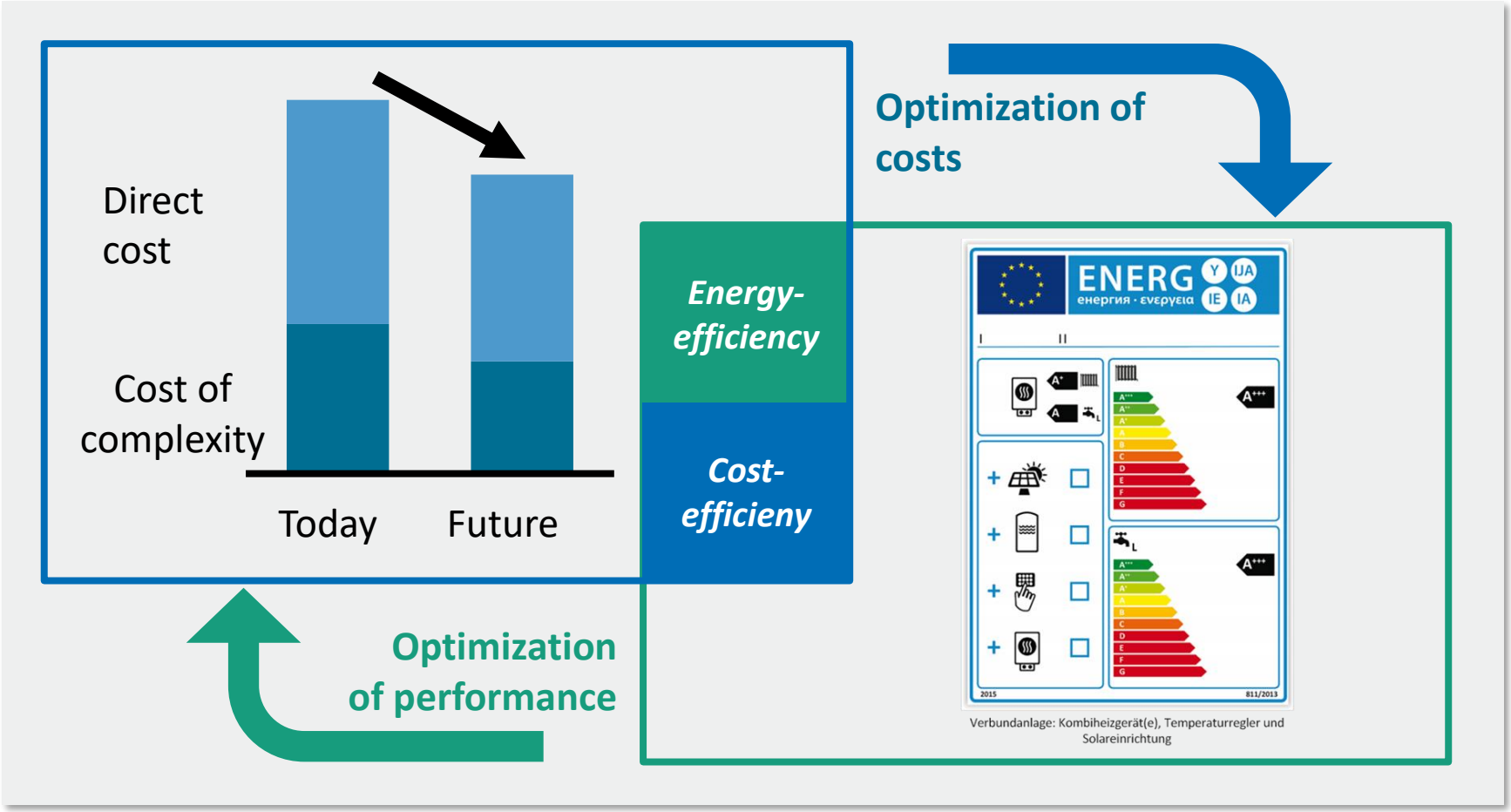
Integrated Performance and Cost Optimization



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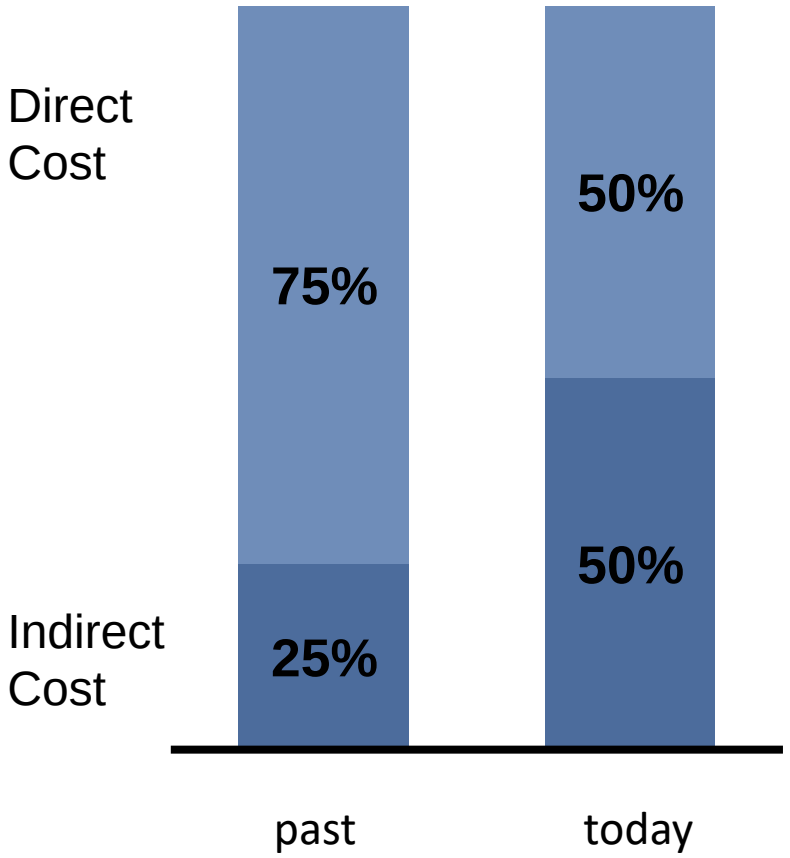
Methods of Cost Optimization

1. Complexity analysis
   - **Reduction of complexity and management of diversity**
2. Process chain analysis
   - **Cost reduction in the processes (indirect cost)**
3. Value analysis
   - **Cost reduction of the product (direct cost)**
4. Performance analysis
   - **Performance optimized product and system design**

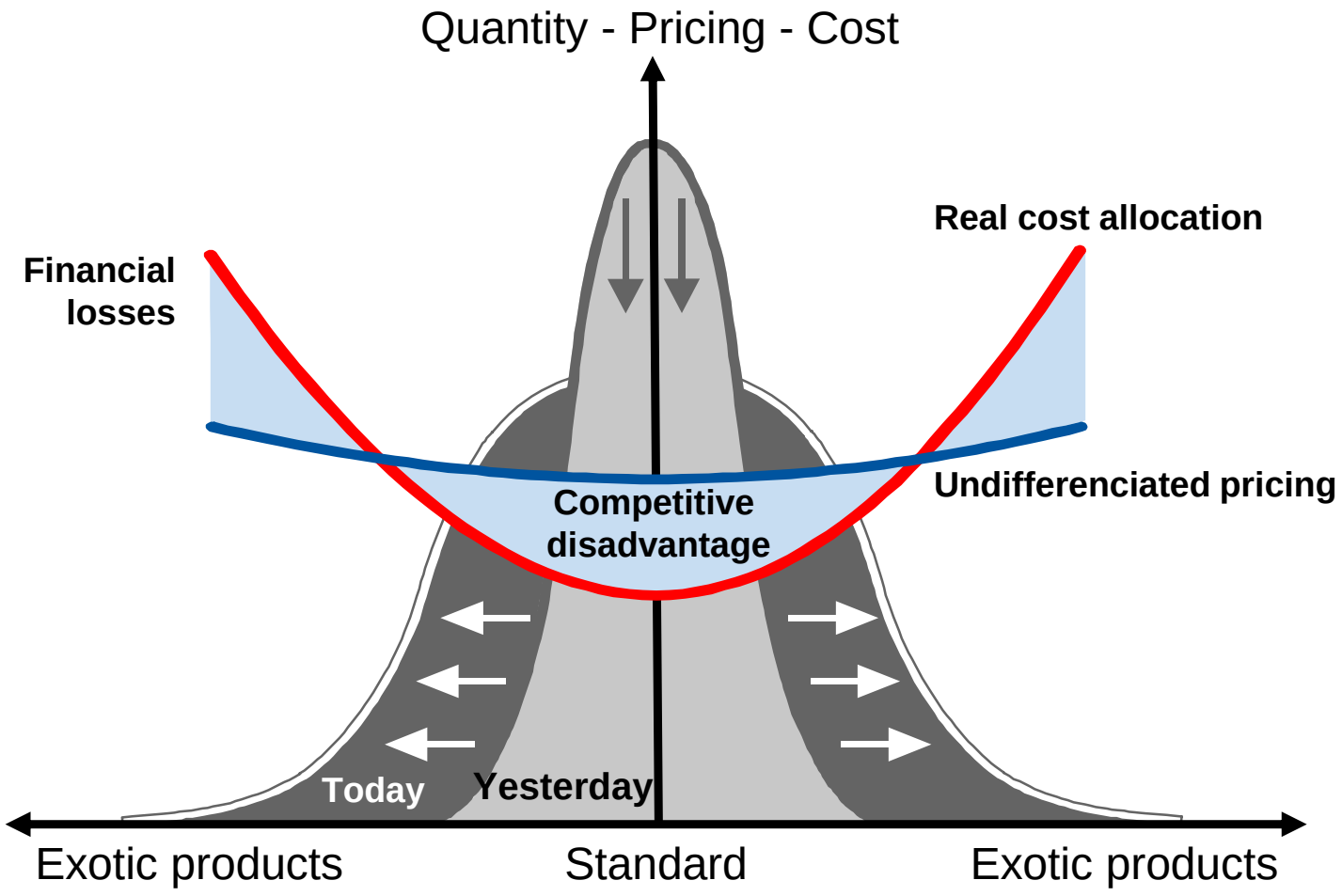
Expected cost reduction 20%

Process Chain Analysis

- Identification of indirect cost drivers
- Quantification of cost effects based on product complexity



Process Chain Analysis
Approach of Over-Head Cost vs. Process Cost Analysis



Conclusion

- **Tools for economical optimization of solar thermal value chain are available**
- **Prior experience shows that cost reduction of 20% are feasible by using such approaches**

Thank You for Your Attention!

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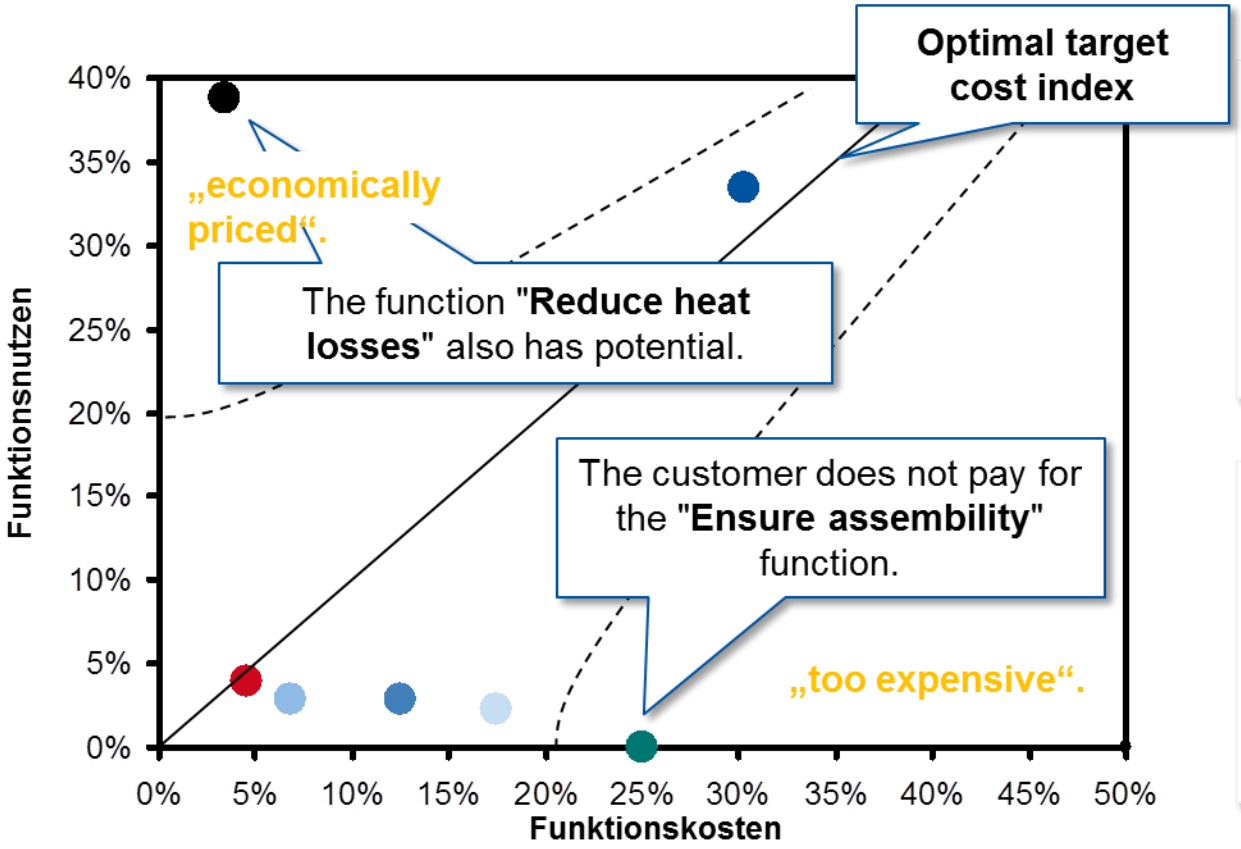
Value analysis

- Identify customer benefit/cost relation for the system
- Cost optimization of the product with detailed regard to customer demands

Value Analysis
Customer Benefit vs. Cost



- Produce thermal energy
- Transfer/transport thermal energy
- Store thermal energy
- Monitor useable solar yields
- Aesthetic impact to the environment
- Ensure assemblility
- Reduce thermal loss

- The diagonal represents the **optimal case**
- The further the function is away from the diagonal, the more **potential for improvement** exists

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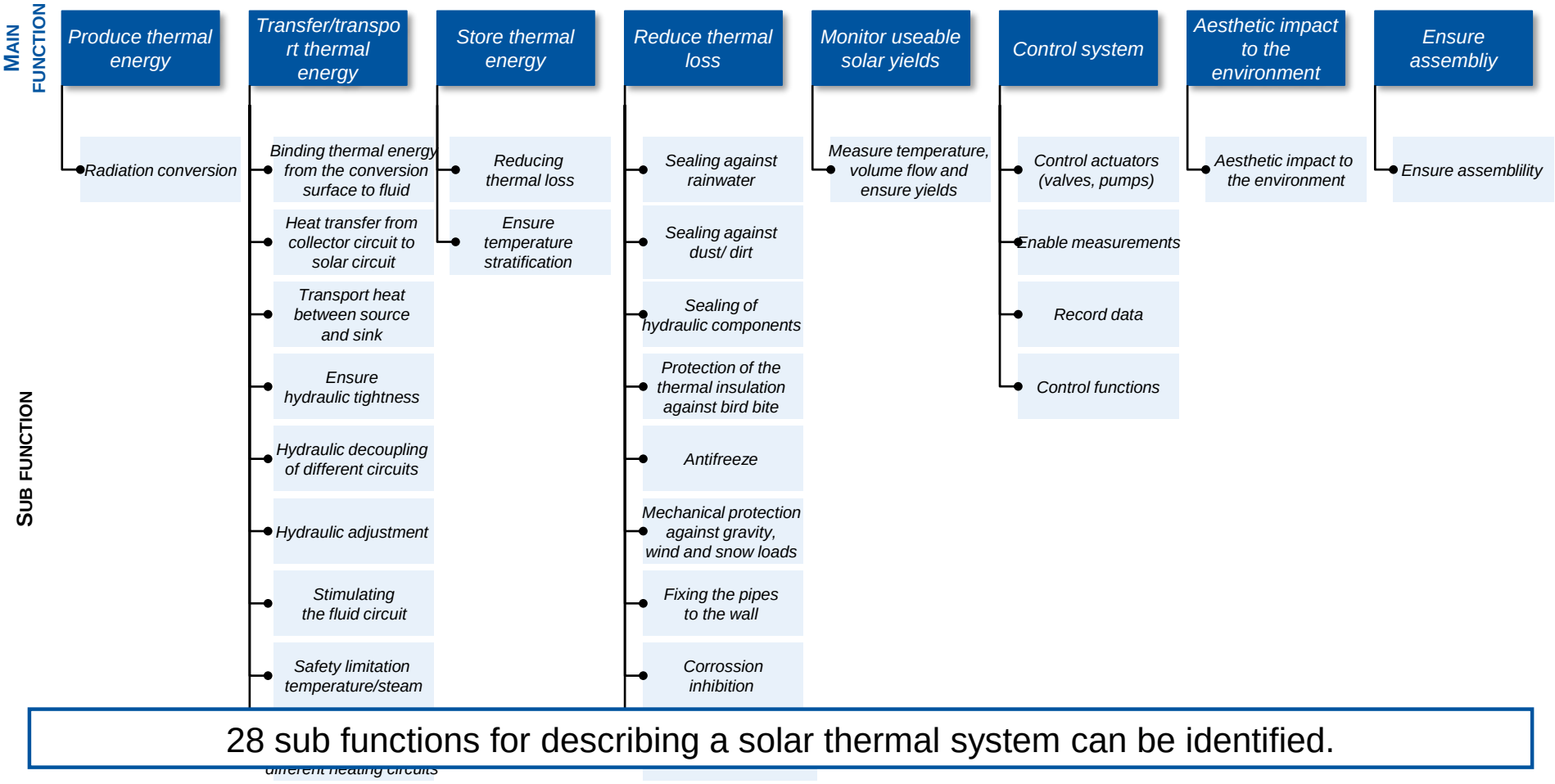
A uniform functional description forms the basis of the value analysis for the comparability of different systems

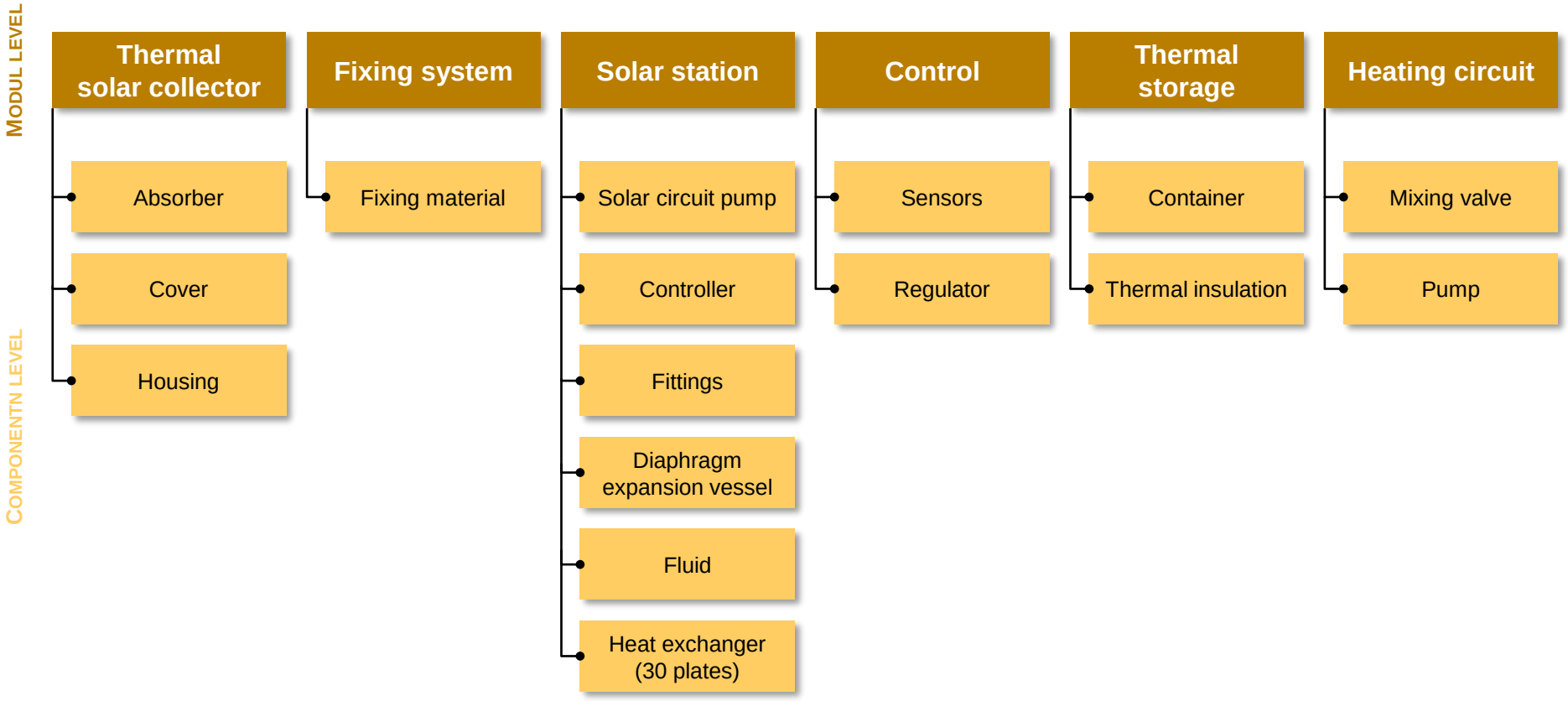
Functional structure



28 sub functions for describing a solar thermal system can be identified.

For determining the functional costs, the contribution of the individual components to the functions must be described

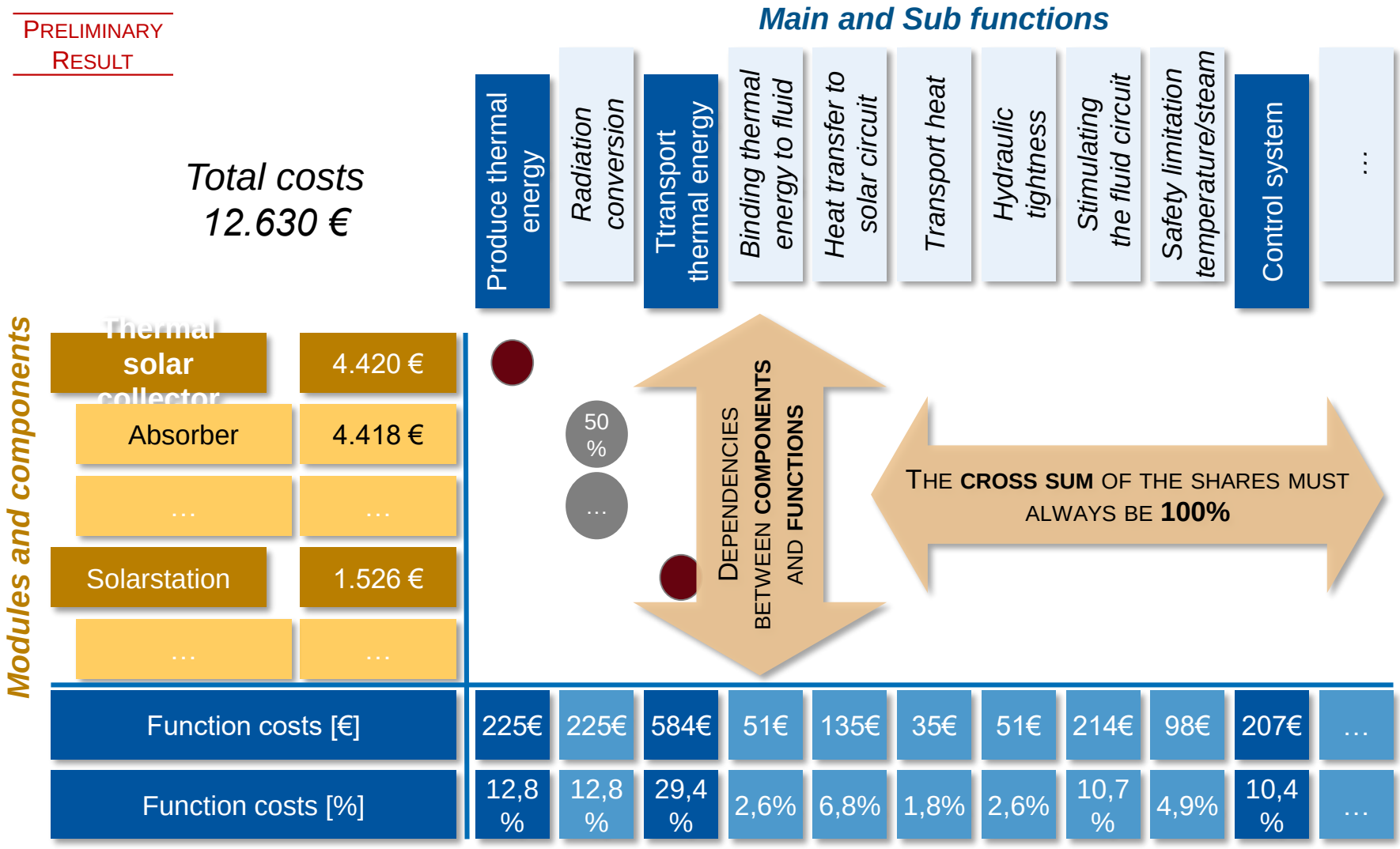
Generic product structure



The solar thermal system consists of six generic modules with 16 components.

To determine the functional costs, the contribution of the individual components to the functions must be described

PRELIMINARY RESULT



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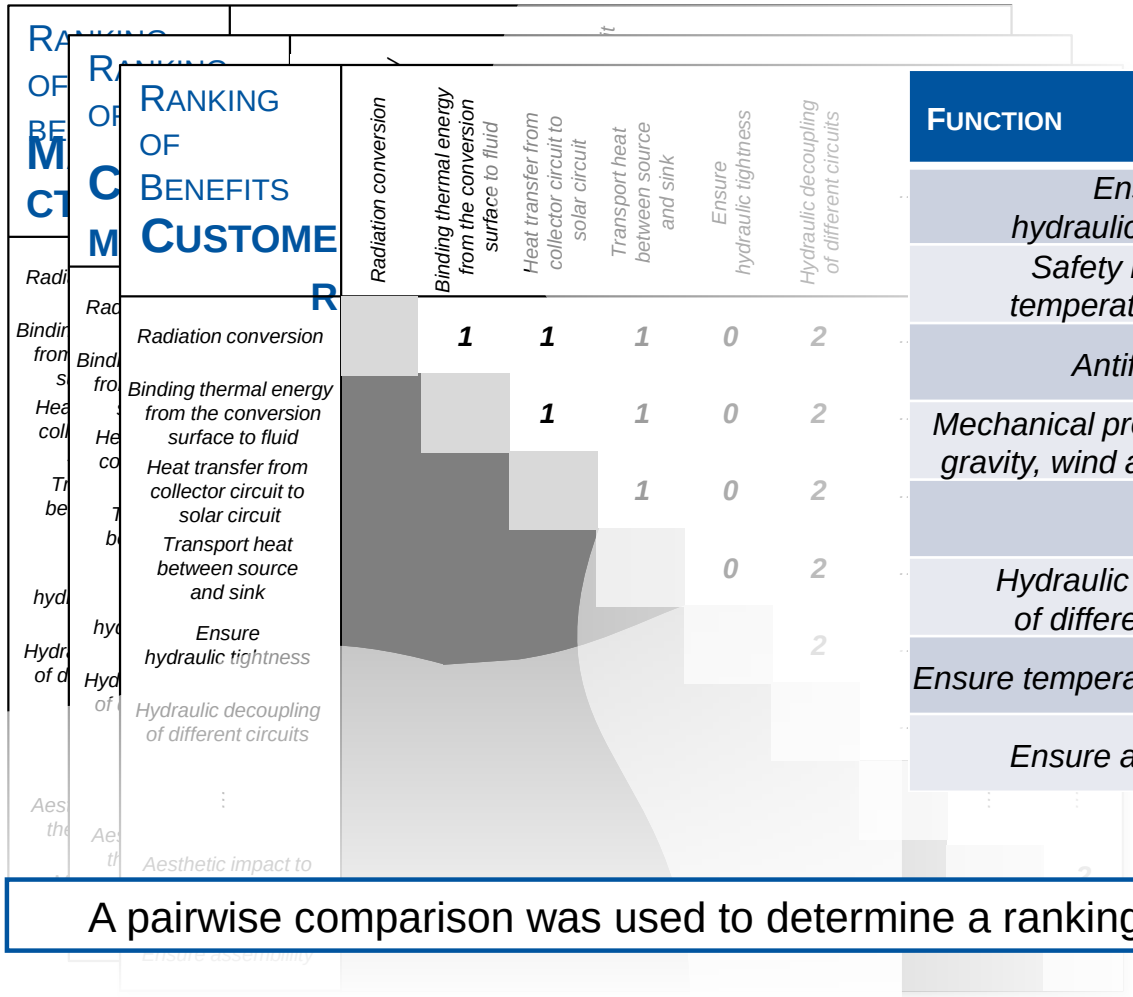
The benefits are considered from the perspective of the manufacturer, wholesaler, craftsman and customer.

Ranking of benefit for customer



Function	Rang	Share of benefit
Ensure hydraulic tightness	1	6,88 %
Safety limitation temperature/steam	2	6,75 %
Antifreeze	3	6,35 %
Mechanical protection against gravity, wind and snow loads		6,35 %
⋮	⋮	⋮
Hydraulic decoupling of different circuits	26	0,93 %
Ensure temperature stratification	27	0,53 %
Ensure assembility	28	0 %

A pairwise comparison was used to determine a ranking of benefits for each stakeholder.

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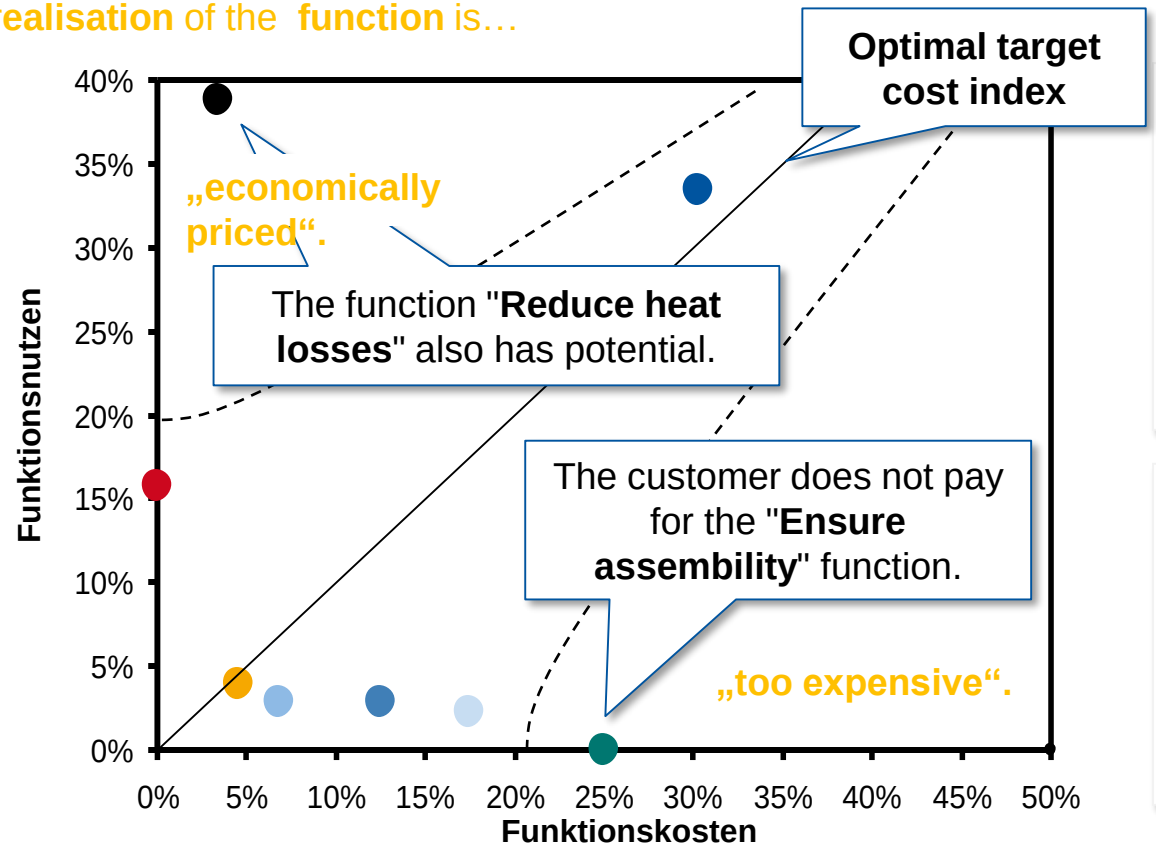
The objective of value analysis is to compare the costs and benefits of the individual product components

Cost-benefit assessment for the customer

PRELIMINARY RESULT

The **realisation** of the **function** is…



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The cost-benefit diagram illustrates the fields of action for optimization.

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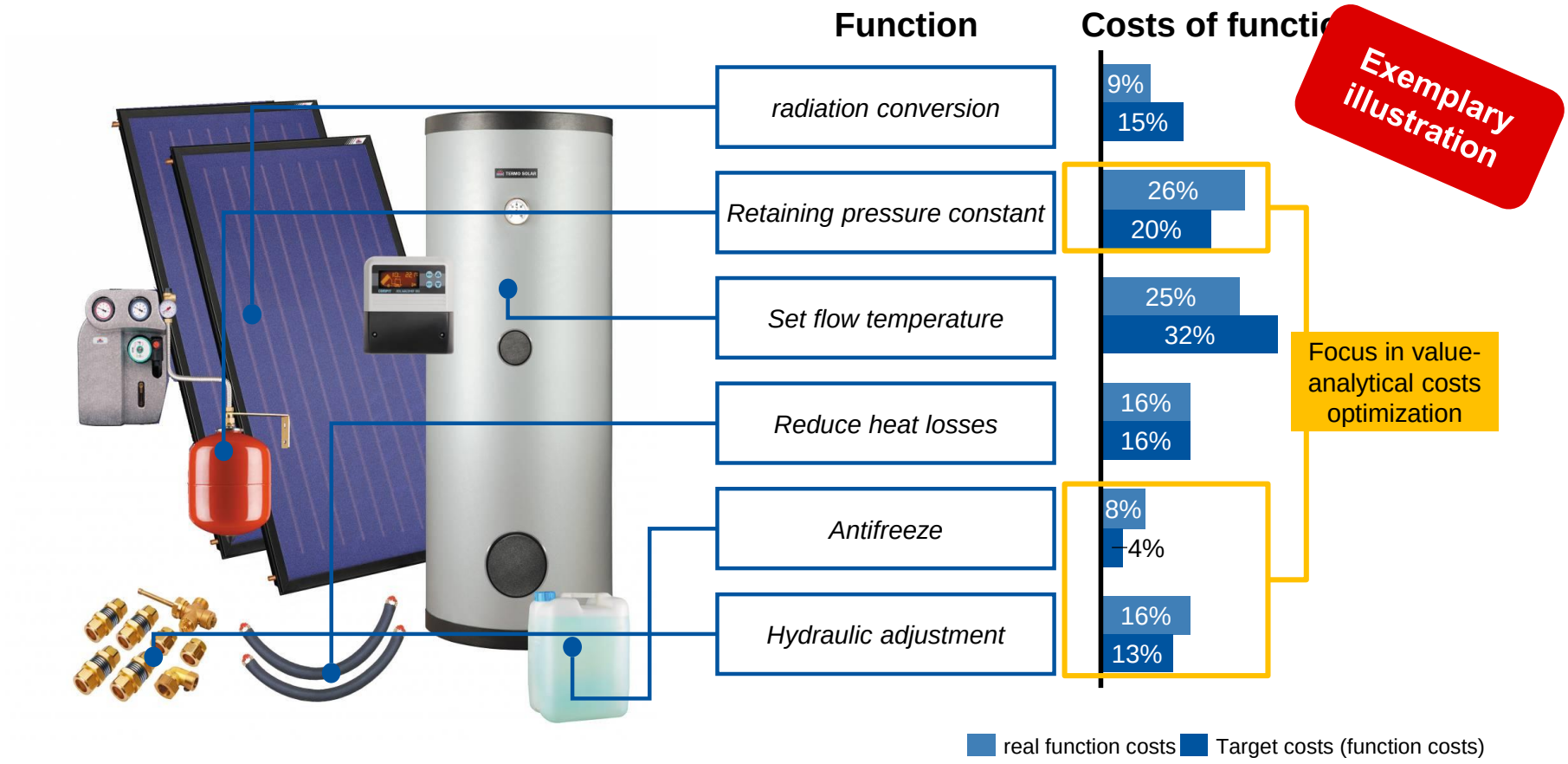
The savings potential can be determined by comparing functional costs and benefits



Based on the functional cost analysis and benefit analysis, the value-analytical production cost optimization can be efficiently focused.

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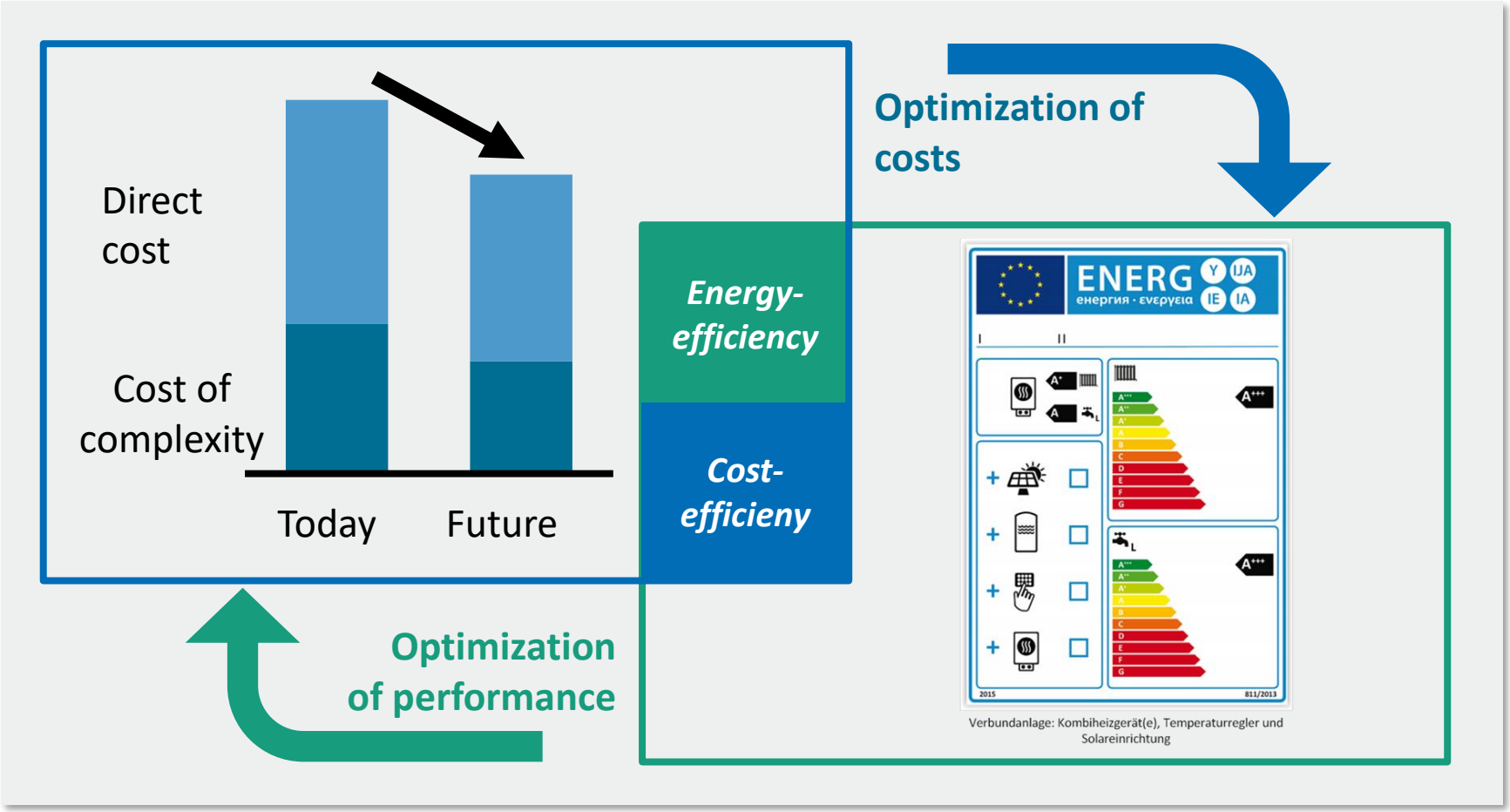

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Outcome of the Project

- New integrated method for combined technico-economic optimization of solar thermal systems including the **complete value chain** from product development to installation
- **Approval** of the method with **industrial and craft partners**
- **Identification** of a first **optimization** potential for some **individual partners** and in the solar thermal sector