Innovation in industrial energy efficiency controlling and its contribution towards the transition of the energy sector

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Energy efficiency: low tech or highly innovative?

Energy savings through efficiency projects

VERSUS

Energy efficiency in an integrated management process

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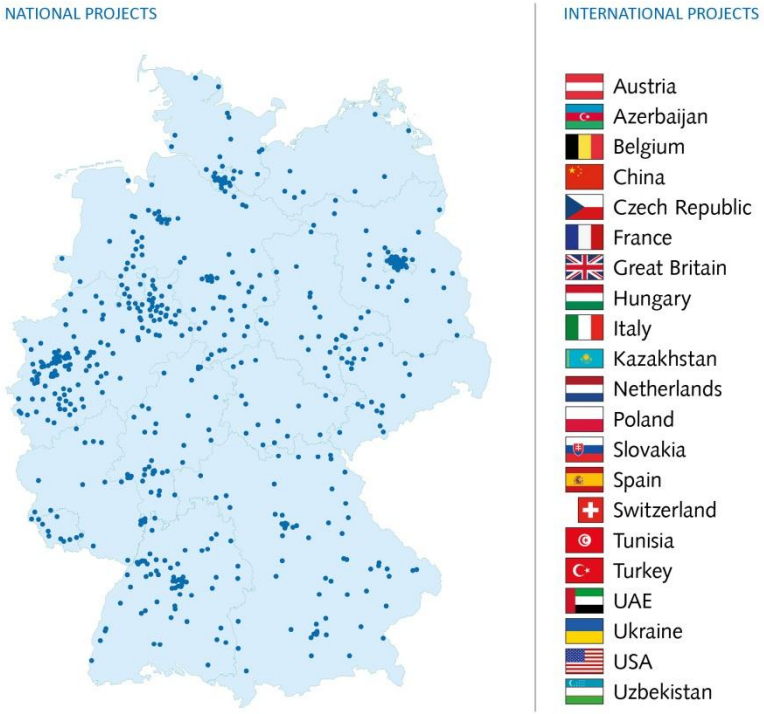
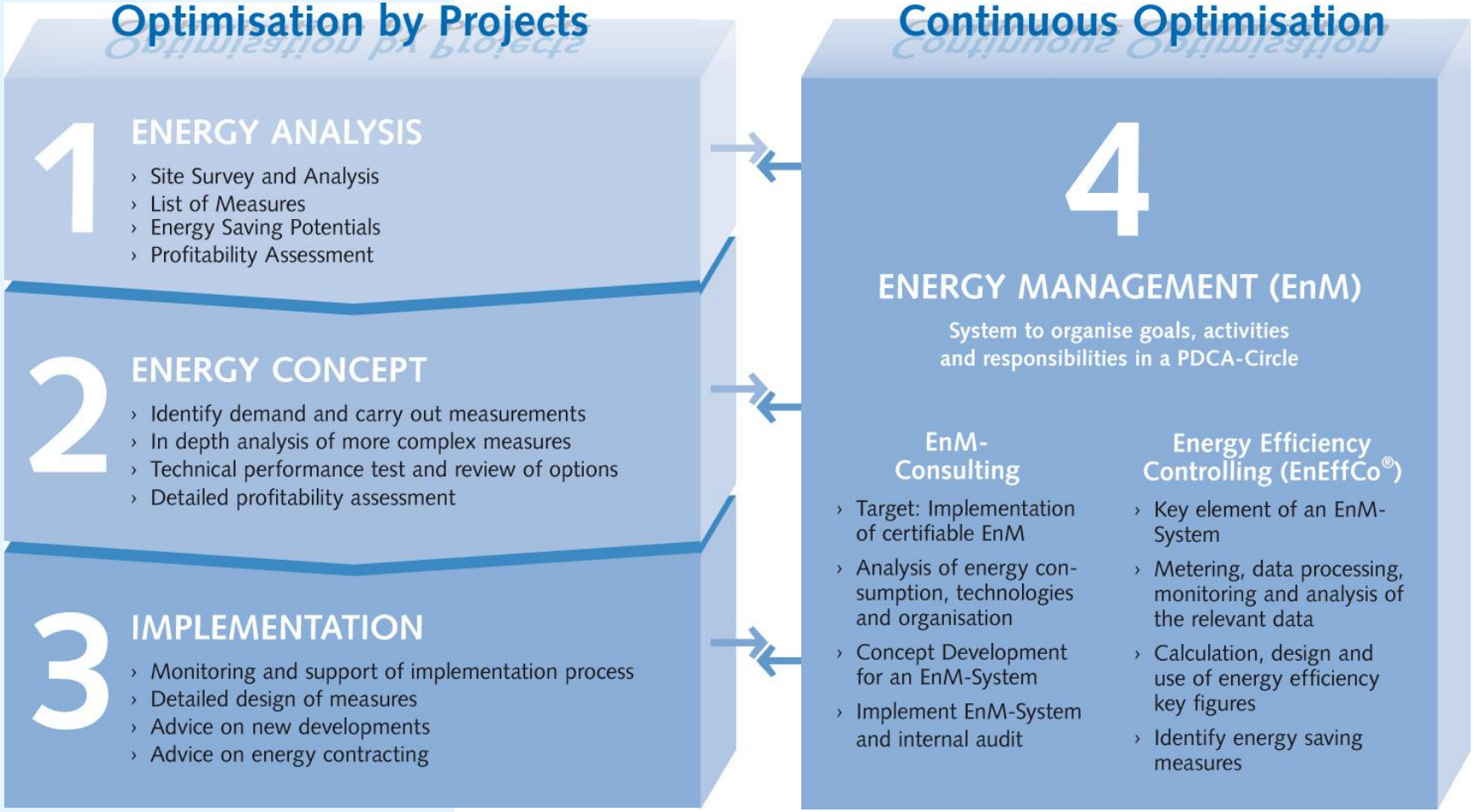
Company Profile: ÖKOTEC Energiemanagement GmbH

- Energy management consulting since 1999
- Technology und Organization
- Many years of experience in all relevant industrial sectors, commercial business and buildings
- Interdisciplinary team of 35 staff members
- **A leading energy efficiency specialist with projects at more than 800 national and international sites**



On the way to an innovative energy management



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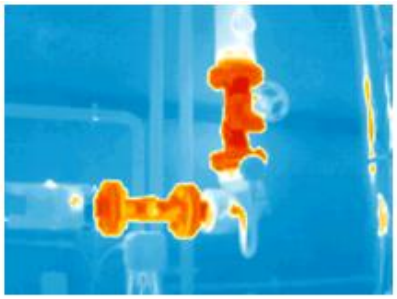
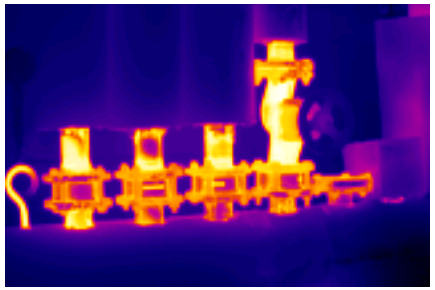
Heat and cold insulation – Reduction of heat losses

- Insulation of distribution infrastructure
- Insulation of surfaces of production facilities
- Coverage of thermal baths





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Quantative targets of the energy transition and status quo

	2014	2020	2030	2040	2050
Greenhouse gas emissions					
Greenhouse gas emissions (compared with 1990)	-27 %	at least -40 %	at least -55 %	at least -70 %	at least -80 bis -95 %
Renewable energy					
Share of gross final energy consumption	13.5 %	18 %	30 %	45 %	60 %
Share of gross electricity consumption	27.4 %	at least 35 %	at least 50 % Renewable Energy Sources Act 2025: 40–45 %	at least 65 % Renewable Energy Sources Act 2025: 55–60 %	at least 80 %
Share of heat consumption	12.0 %	14 %			
Share in transport sector	5.6 %				
Efficiency and consumption					
Primary energy consumption (compared with 2008)	-8.7 %	-20 %	→		-50 %
Final energy productivity (2008-2050)	1.6 %/year (2008–2014)	2,1 %/year (2008–2050)			
Gross electricity consumption (compared with 2008)	-4.6 %	-10 %	→		-25 %

source: BMWi 2015 Energy for the future

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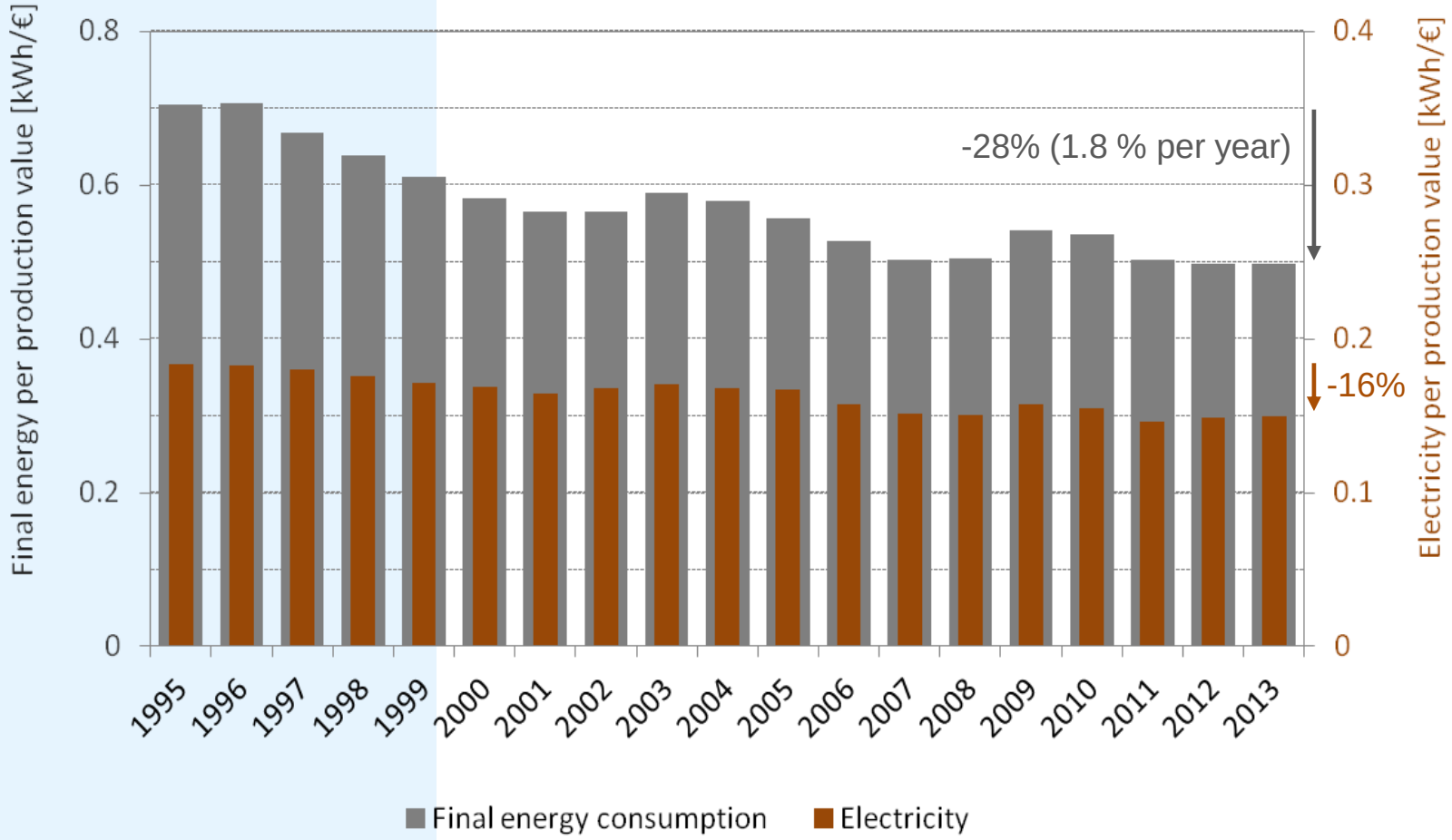
Policy goal of annual savings of 2.1 % final energy intensity



Quelle: Grein 2016 Contribution of industrial flexibility to the german electricity market, vgl. destatis 2015

Development of final energy intensity of the German industry

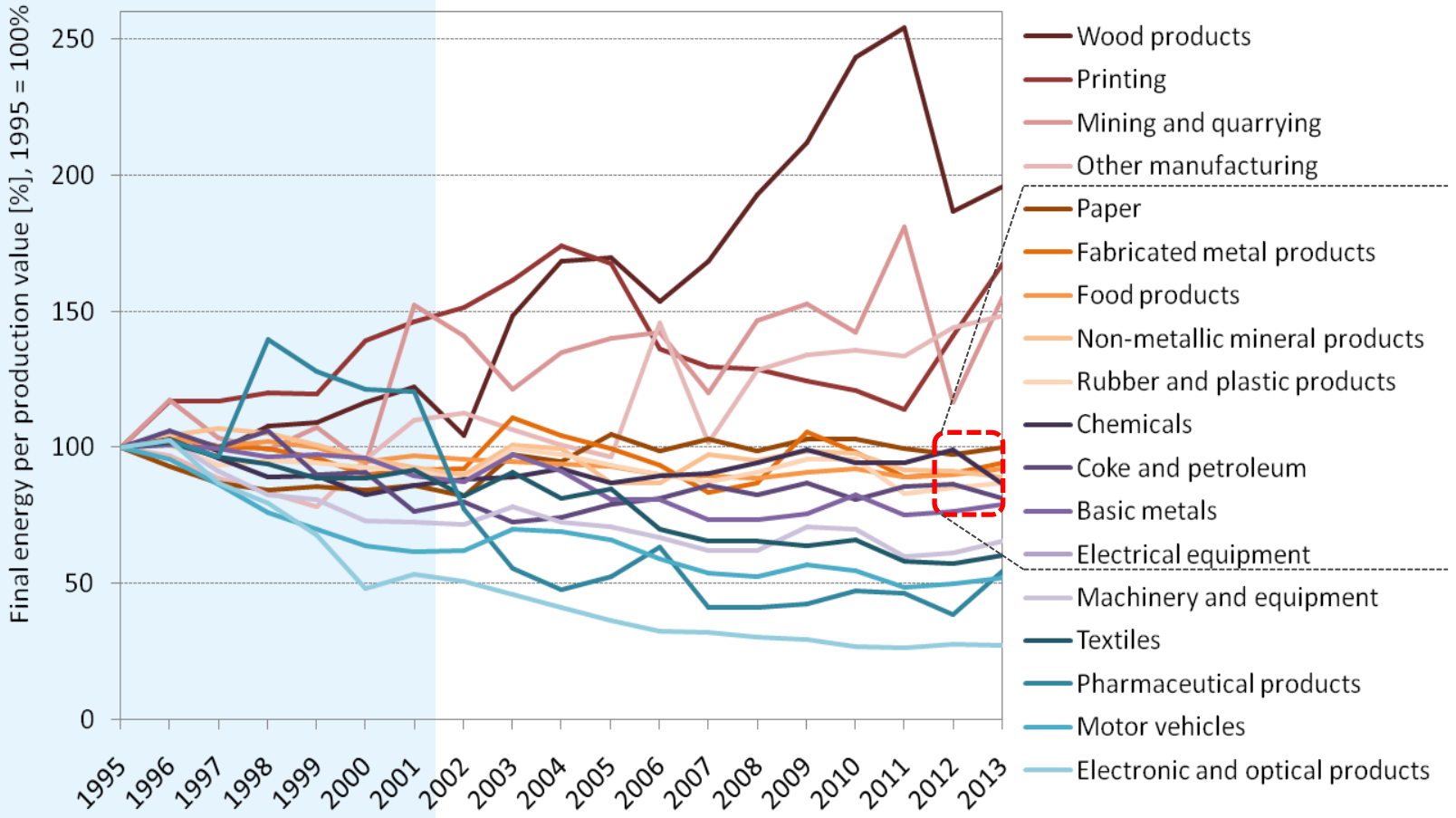
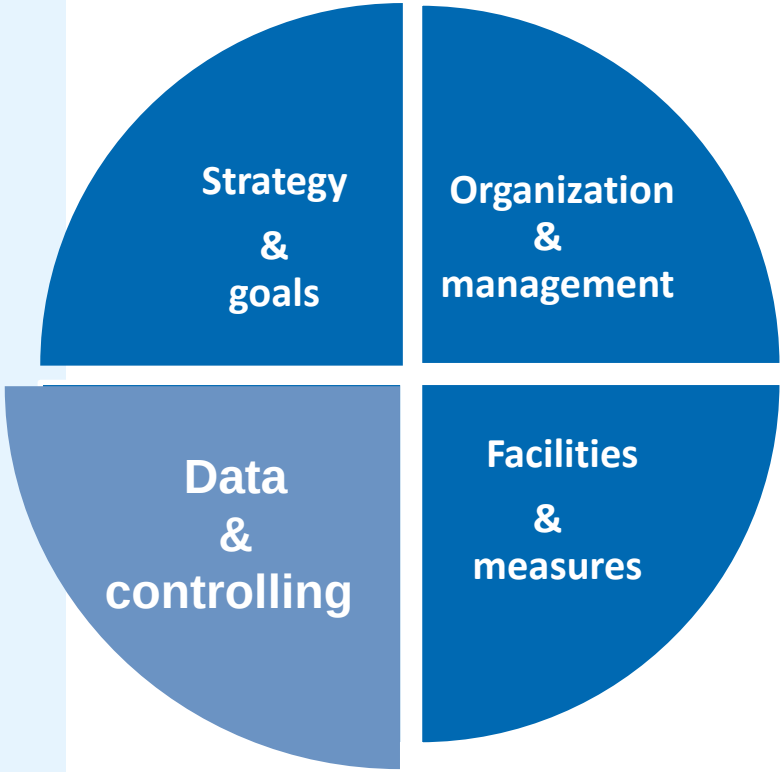


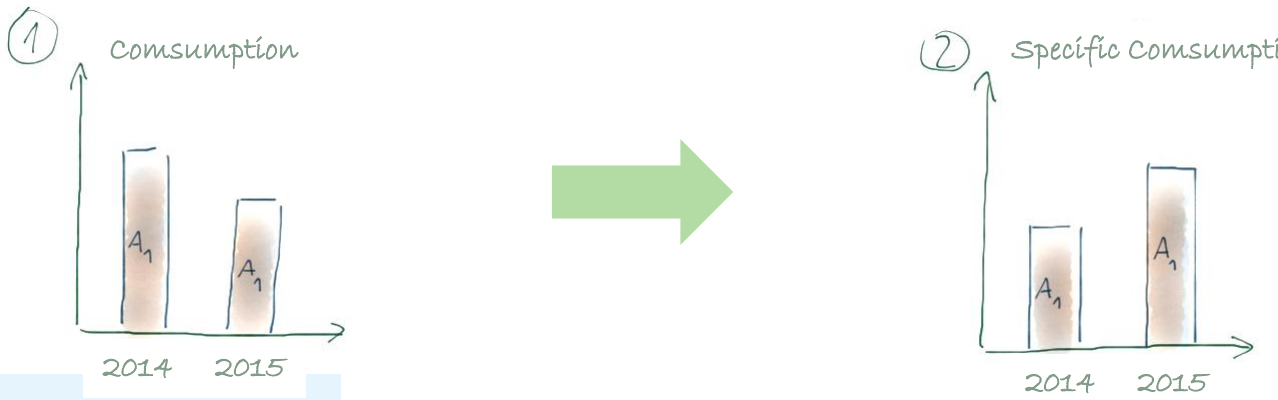
Figure: own calculation, based on destatis 2015

Key factors for intelligent energy management



EPI*-based energy efficiency controlling with EnEffCo

- **Representation of consumption is only “half the truth”**
  - Example: The consumption from plant A1 decreased, indicating operational improvement.



  - The specific consumption has however increased, thus the plant was less efficient.
  - Taking influence factors such as temperature or pressure into account, results can further deviate.
  - Conclusion: The solution is energy efficiency controlling.

- **EnEffCo® is your tool for the analysis and improvement of energy efficiency**
  - ✓ Consumption controlling (allocation of energy costs to source)
  - ✓ Energy efficieny controlling (monitoring, analysis and evaluation)

* Energy Performance Indicator

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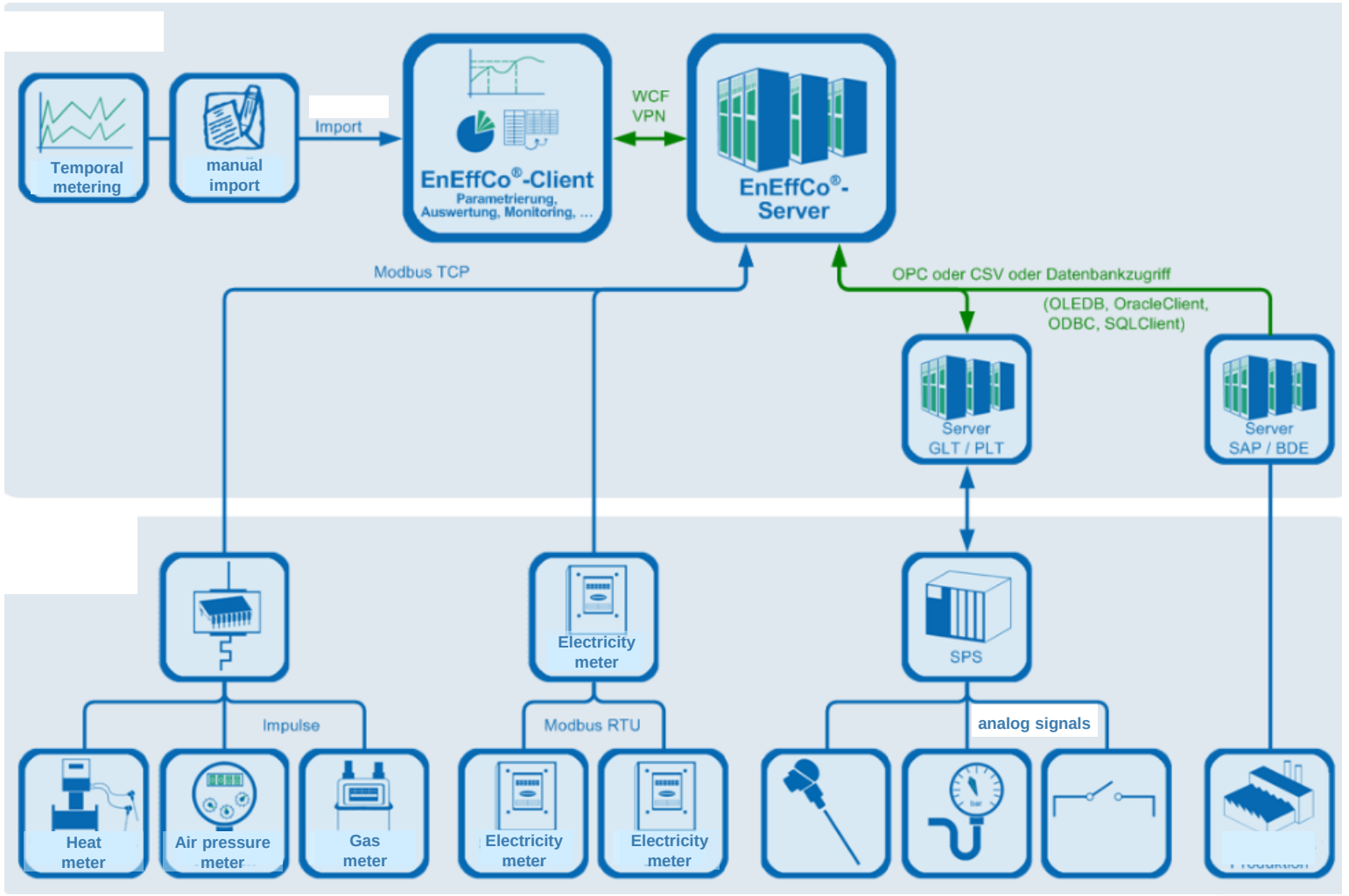
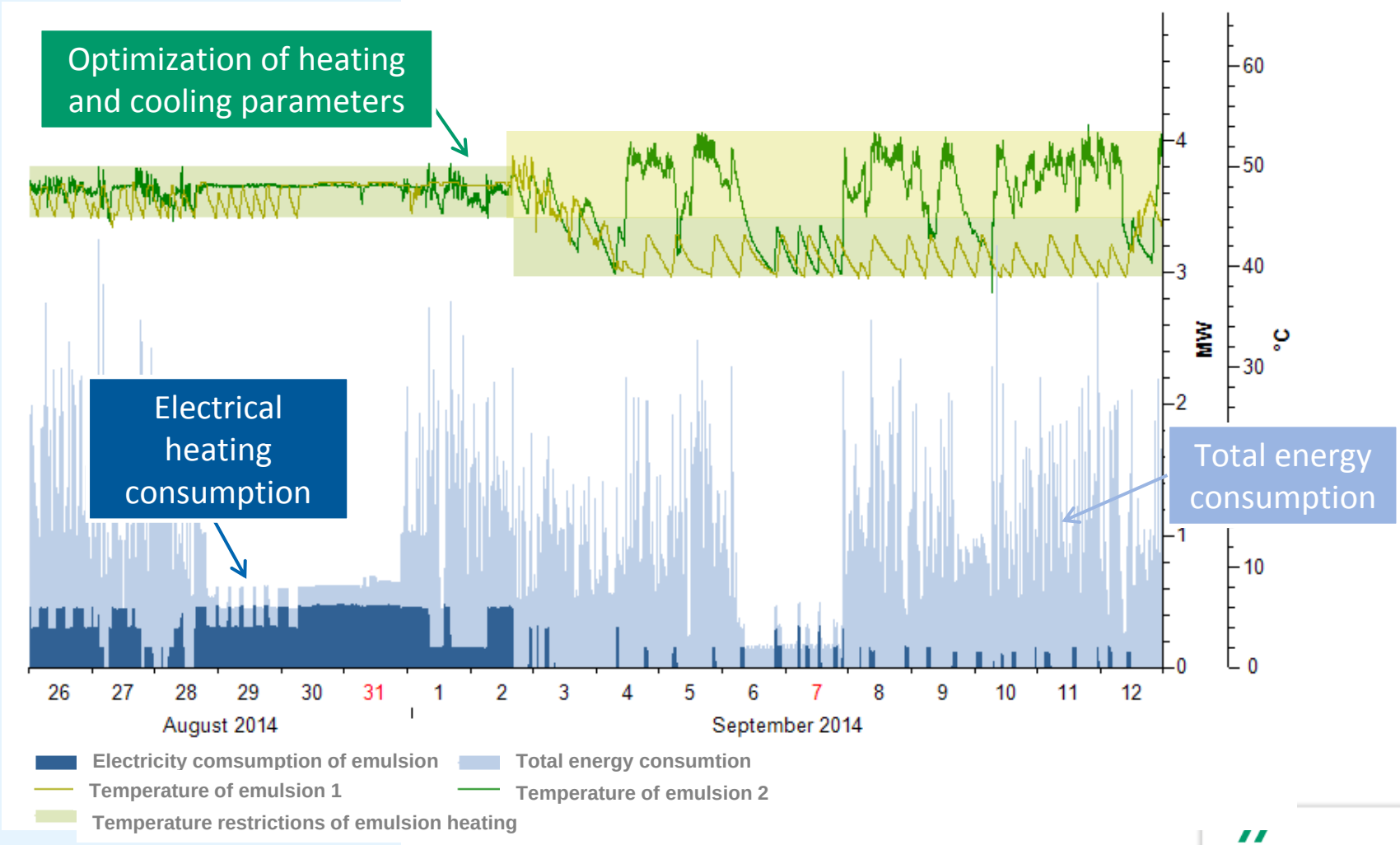
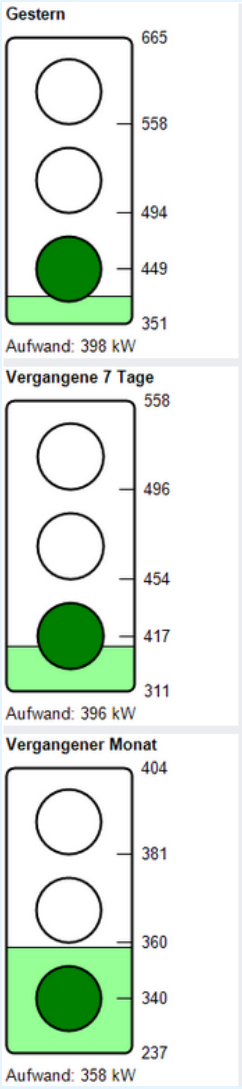
Objective: Integrated measuring and control system

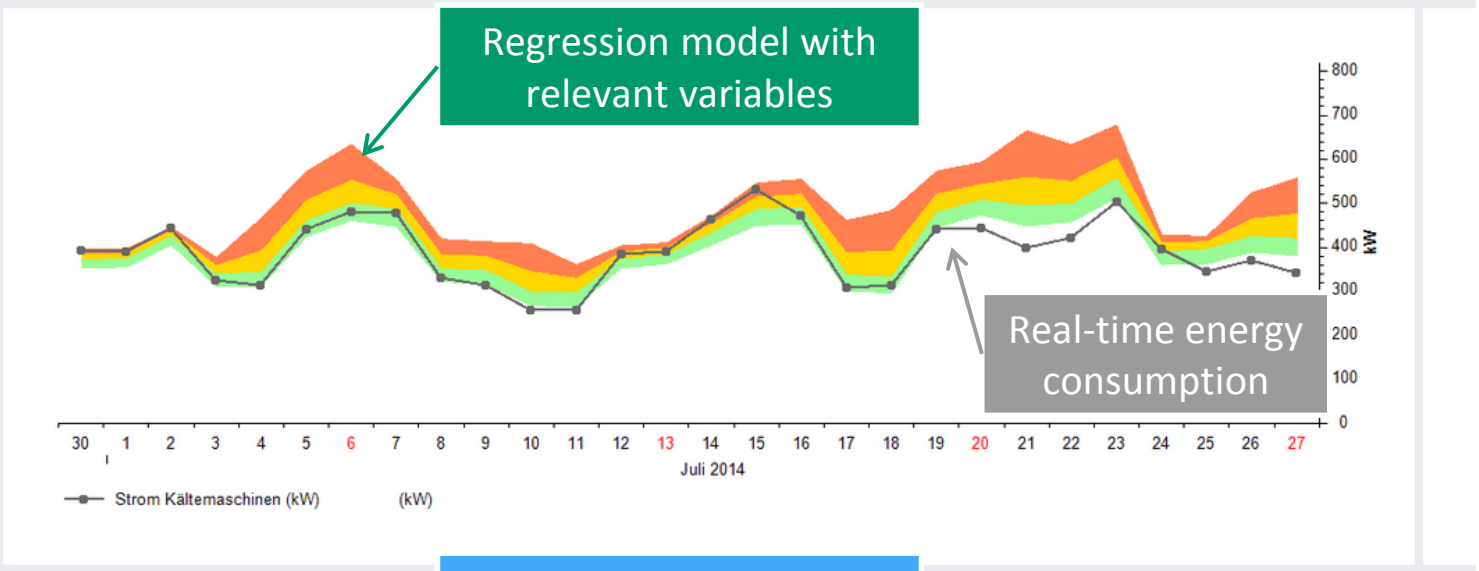


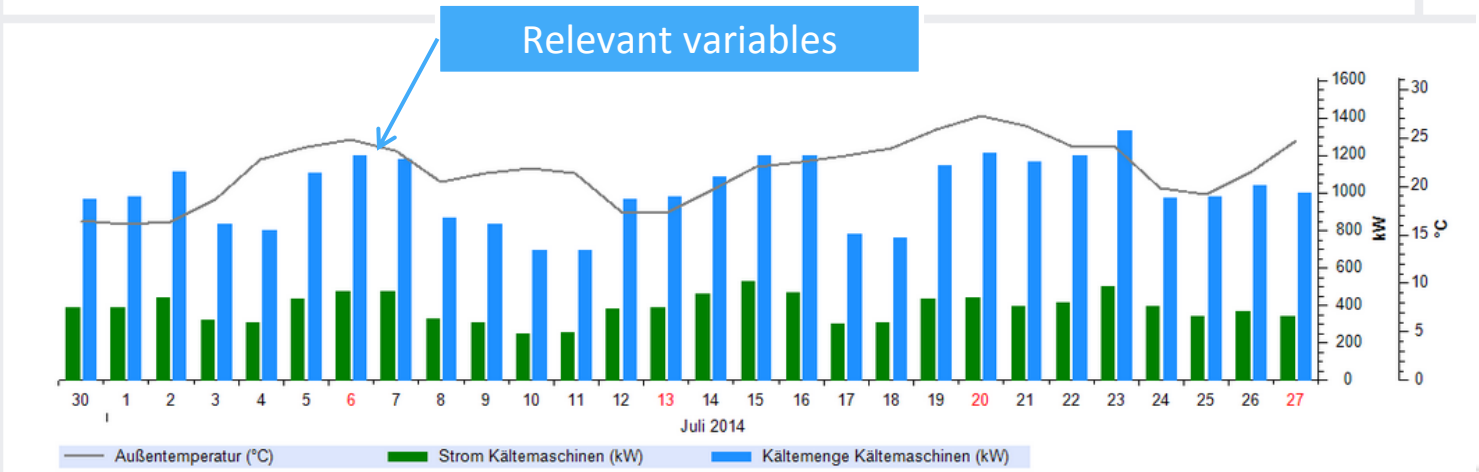
Example 1: Optimization of heating and cooling parameters by real time data analyzing



Example 2: M&V of facility efficiency with dynamic target values







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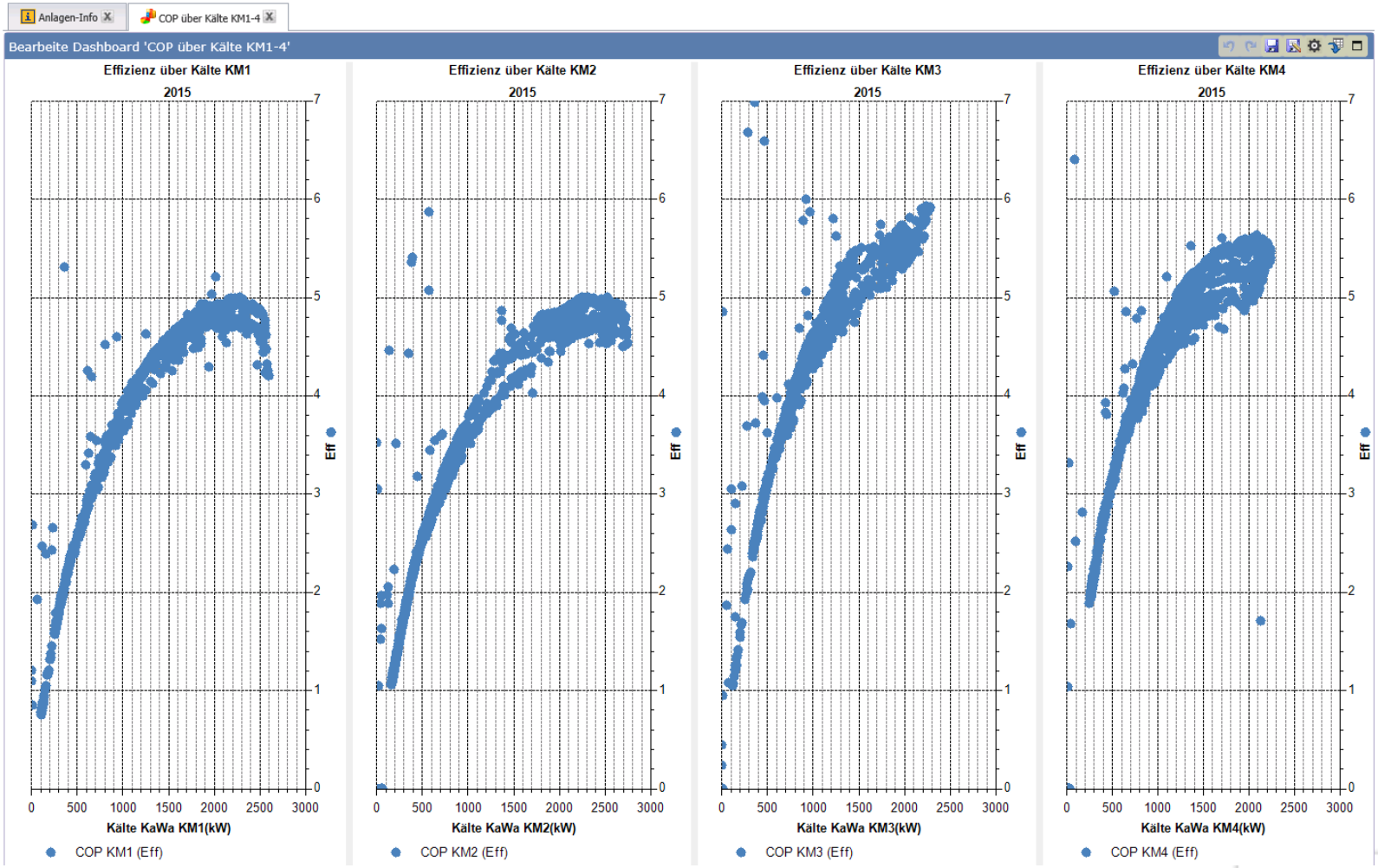
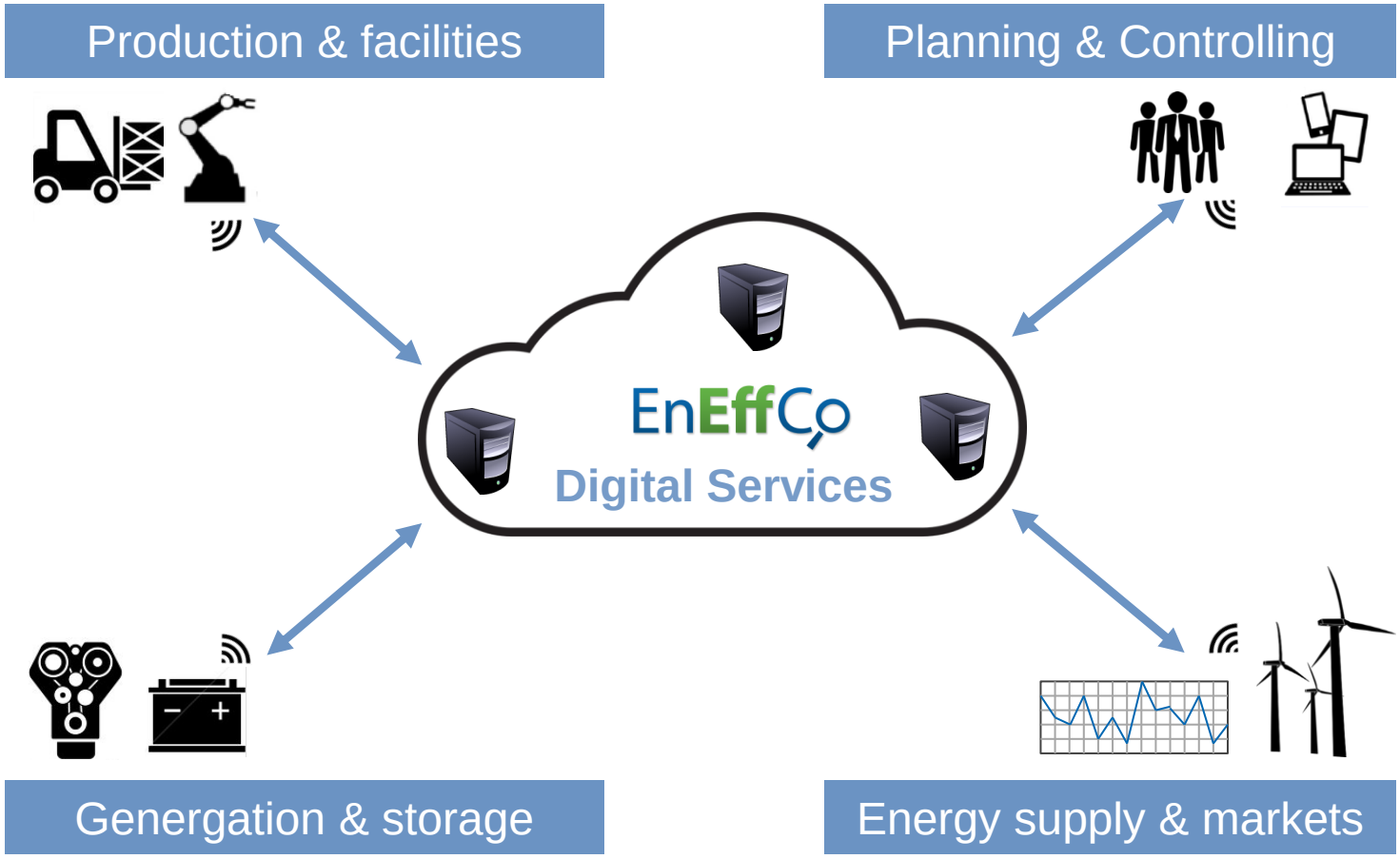
Example 3: Continuous analysis of EPI‘s for priority operation and maintanance monitoring



Energy controlling and industry 4.0 applications



Conclusion for an innovative energy controlling

- ✓ EnEffCo data analysis and digitalization enhance potential for continuous energy efficiency measures!
- ✓ Big data does not realize energy efficiency, field experience is required!

- **Key factors**
  - Incorporation of efficient energy management processes required
  - Continuous and automated process of data collection, analysis and evaluation using adequate energy efficiency performance indicators
  - Strategic contribution and professional support for efficiency controlling and realization of efficiency measures
- **Topics for the future…**
  - Digitalization of all energy relevant data
  - Forecast and optimization of production processes and energy consumption
  - Market integration of flexible production processes
  - Interconnection of value chains and business processes (Sales, Finance, Procurement, Legal department, Consumer relations, etc.)

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