



Energy efficiency - Trends for EUREM alumni

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Agenda

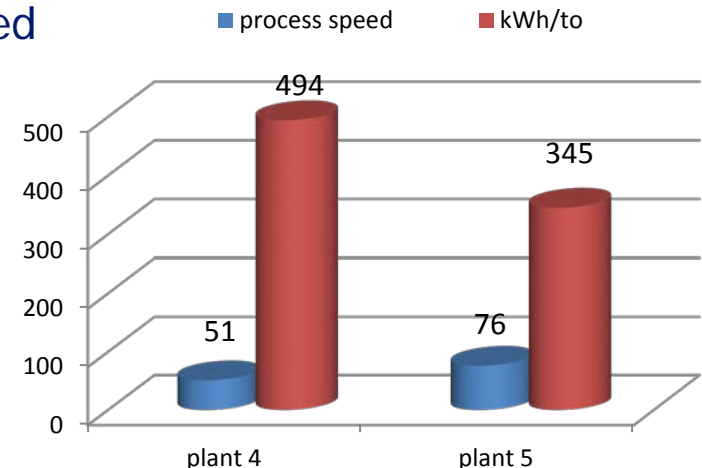
- Energy Efficiency – Trends for EUREM alumni
 1. Process optimisation
 2. Power self supply where appropriate (supply security)
 3. „right“ load management
 4. Development of key performance indicators
 5. Energy data systems (load analysis of plants)
 6. Integration of renewable energy generation (PV, small wind power plant)
 7. Storage technologies

Saving potentials of the future lie in optimisation of processes



- Focus until now: improvement of interface technologies
 - compressed air
 - lighting
 - heat supply
- Advantage: can be optimised individually
- Disadvantage: limited potentials which are quickly exhausted

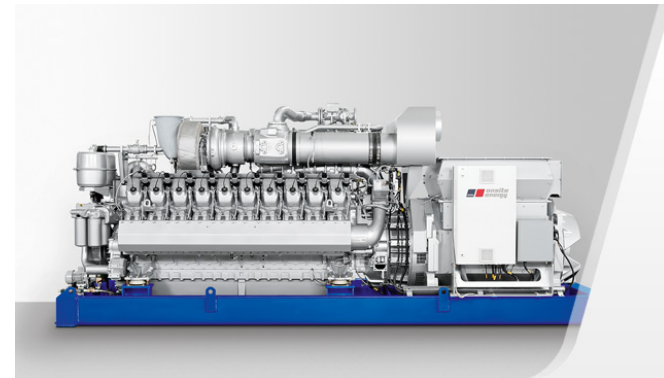
- Future focus: process optimisation of production plants
 - increase of output
 - optimisation of energy technologies integrated into production plants
 - Goal: improvement of specific consumption
- Advantage: still significant potentials available
- Disadvantage: lack of knowledge, optimisation at heart of process



Ensuring the base load through own power generation creates supply security

- Focus until now: external power supply at economic conditions
 - optimisation of power procurement
 - reduction of taxes and fees
- Advantage: outsourcing
- Disadvantage: dependency

- Future focus: additional own power generation where appropriate
 - Sizing with target maximum own generation
 - optimal integration into internal energy flows
 - attractive economic parameters
- Advantage: security of supply for core process
- Disadvantage: needs care

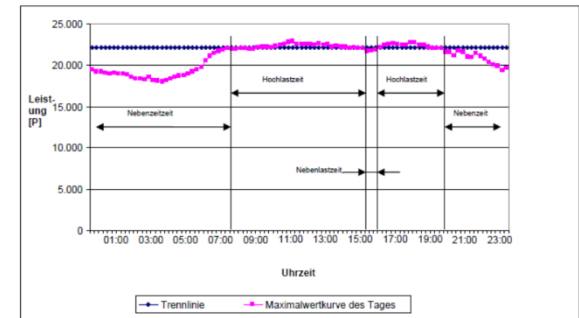


The synchronisation of high grid load with internal load management generates real added value



- Focus until now: peak load reduction
 - Switch off defined consuming units
- Advantage: individual optimisation possible, price reduction for capacity
- Disadvantage: no real support to grid stability

- Future focus: synchronisation of internal and external grids
 - overall load management
 - positive and negative control energy
 - demand optimisation
- Advantage: grid stabilisation, cost reduction
- Disadvantage: large requirements on control ability, speed of load adaptation, automisation of internal grid



The development of adjusted indicators enables realistic assessments of the energy efficiency improvements



- Focus until now: total indicators
 - kWh/tons
- Advantage: easy to calculate, rough figures
- Disadvantage: low information value

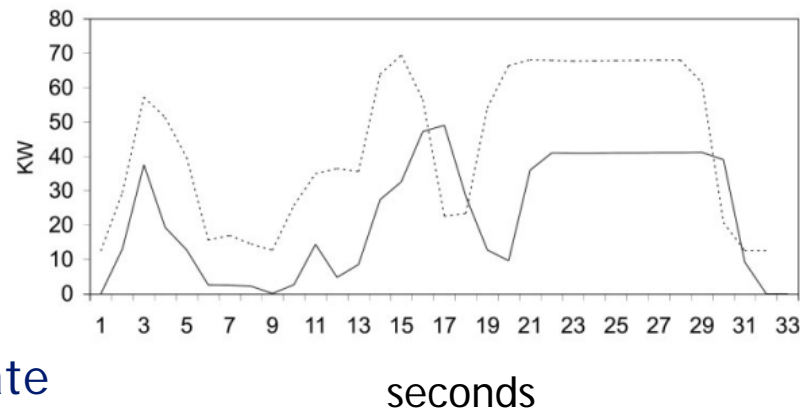
- Future focus: adjusted indicators
 - consideration of significant influencing parameters
 - work load
 - product mix
 - material composition
 - for defined core processes
- Advantage: real development visible
- Disadvantage: more effort, data availability must first be set up



The analysis of load cycles of individual plants/process offers unknown potentials

- Focus until now: load cycles at company level
 - KW / 15 min
- Advantage: easily available
- Disadvantage: processes cannot be assessed

- Future focus: load cycles at specific units and processes
 - peaks
 - stand-By
 - control potential
- Advantage: new insights
- Disadvantage: Effort to measure or evaluate



The integration of renewables discharges the energy bill and improves company image

- Focus until now: image projects
 - small PV installation at head office
- Advantage: little effort
- Disadvantage: no significant contribution to supply

- Future focus: more and more big PV-plants, in some cases wind power
 - use of all local options
 - adapted to self supply
 - Economical profitable
- Advantage: real contribution to site supply
- Disadvantage: system analysis or simulation needed



12,5 KW vertical wind wheel
www.cleanvertec.com



BMW site Leipzig

The development of power storage with good cost ratio revolutionises the power management in businesses

- Focus until now: power storage much too expensive
- Future focus: increasing power storage
 - up to 2 MW
 - flexibilisation of procurement and self supply
 - „smart“ power management
- Advantage: grid stabilisation, cost reduction (capacity related price component)
- Disadvantage: costs (high)



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