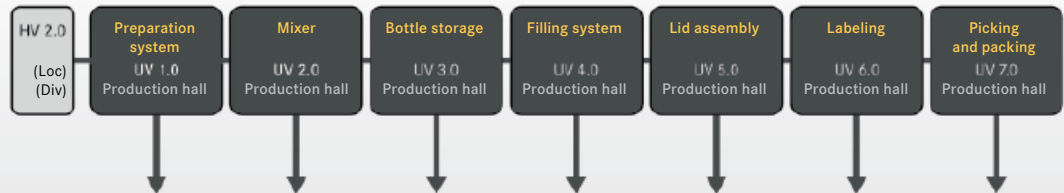




Pushing Performance

# HARTING smart Power Networks in the *SmartFactory*<sup>KL</sup>

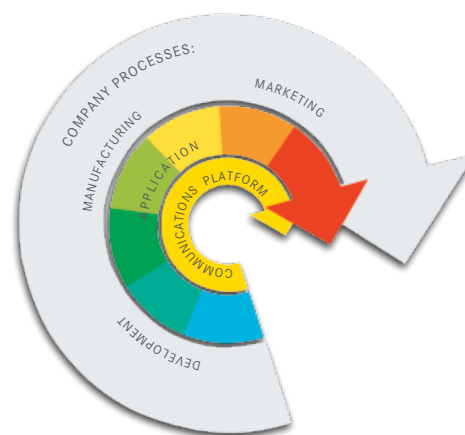




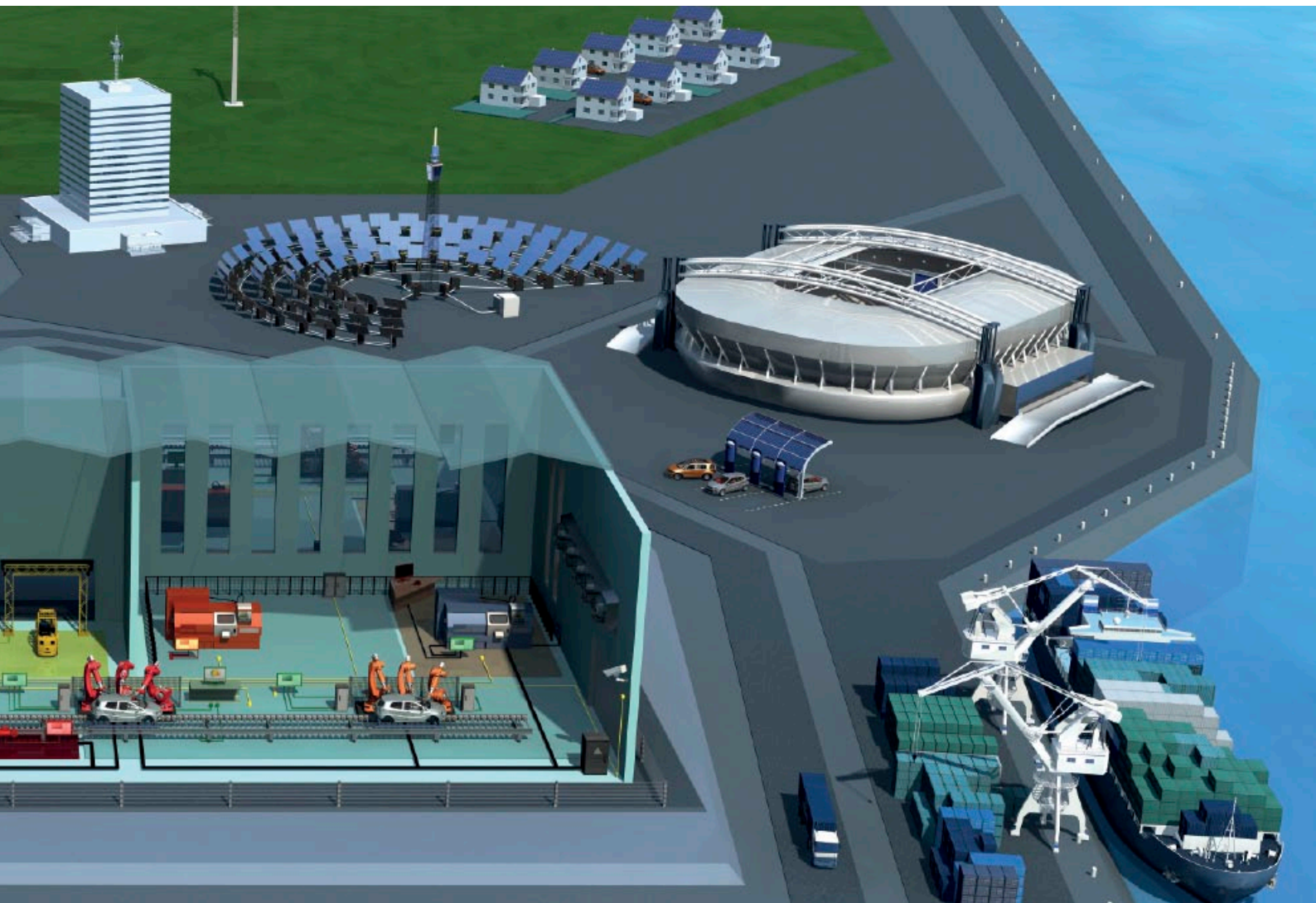
## Smart Network Infrastructure as a key to efficient processes

Efficient industrial production processes need a convergent infrastructure as a platform for all business applications. With this infrastructure, the seamless integration of all applications into one comprehensive value-added process is possible. **HARTING** is pursuing this insight the Automation IT vision.

In order to implement this vision, the **HARTING** Technology Group has developed the concept of the Smart Network Infrastructure. This elevates the data and signal networks to form more than just the configuration and combination of passive components, turning them into an element in the modern process chain that is crucial for function. This allows different applications, each with its own service quality demands,



to use infrastructure simultaneously. Technologies such as RFID, Fast Track Switching (FTS), and Switched Ethernet over Power (SEoP) are helping to bring these integrated Smart Network Infrastructures of the future to life.

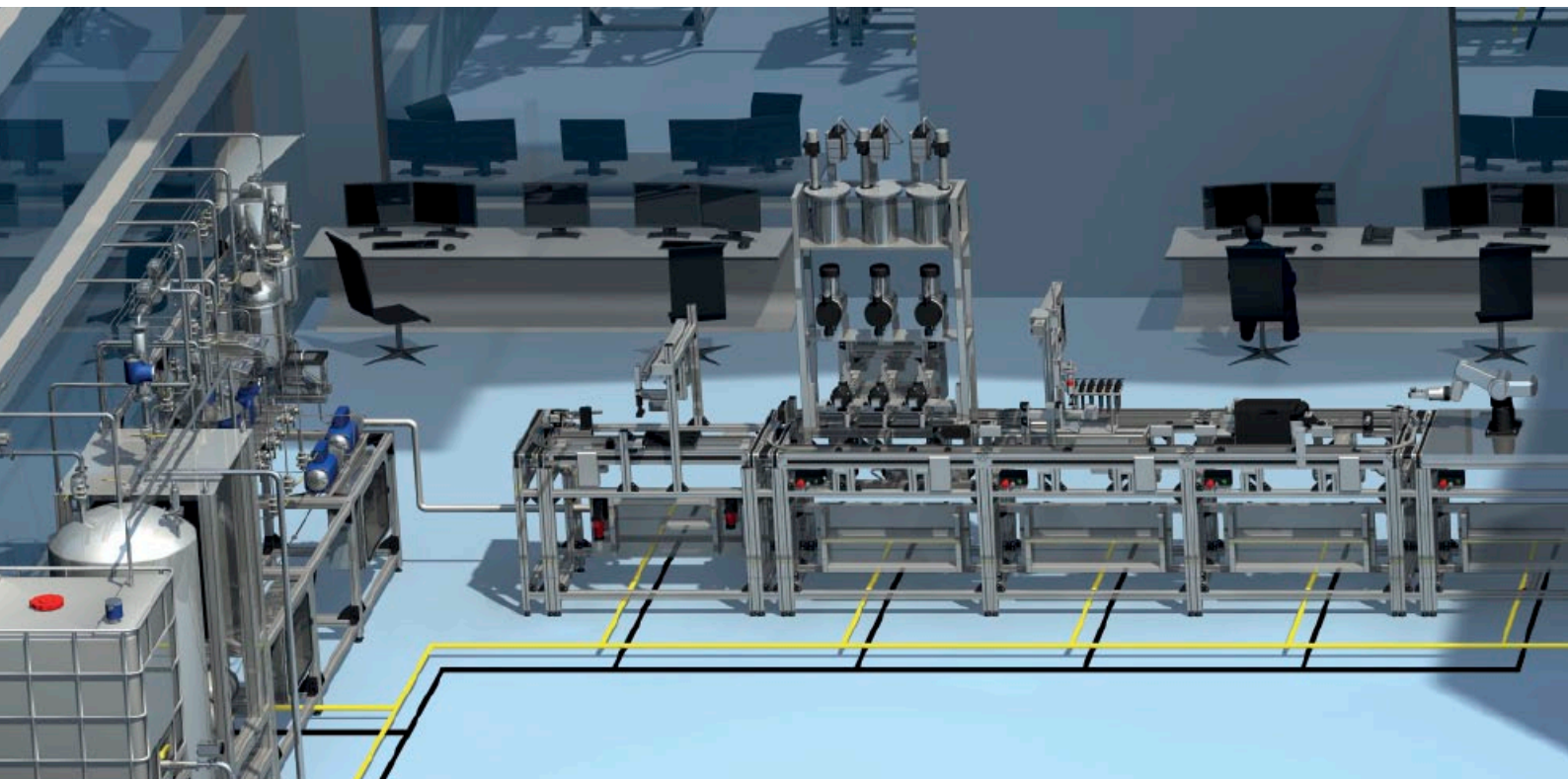


Reduced costs and increased efficiency can only be implemented at a high level if intelligent networks are in place.

Extending this idea, this model applies to all three lifelines in industrial processes: Data, Signal & Power. Integration into process management is necessary to the extent that new energy concepts are redefining power as

a managed resource instead of an endlessly available basis that does not limit the process. The participation of the HARTING Technology Group in the DFKI, (German Research Center for Artificial Intelligence) and the cooperation in the *SmartFactory<sup>KL</sup>* should be seen as a consequence of bringing the Automation IT Vision to life within the framework of the Smart Network Infrastructure.

# *smartFactory<sup>KL</sup>*



## smart Power Networks in the *SmartFactory*<sup>KL</sup>

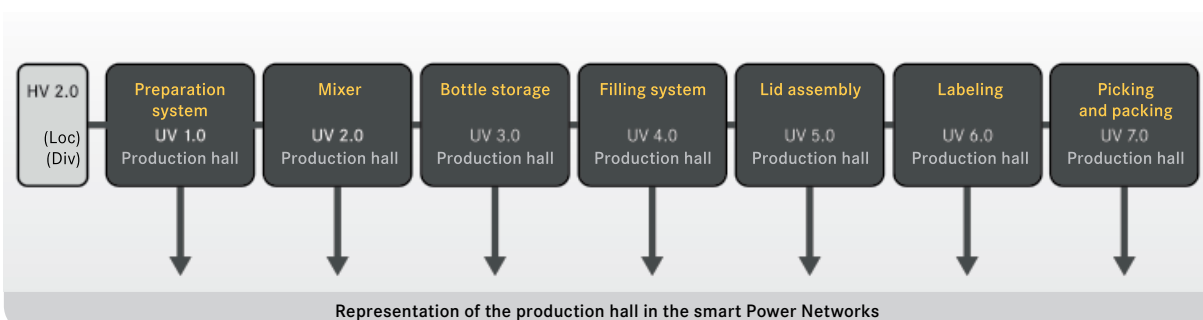
The goal of the *SmartFactory*<sup>KL</sup> is the profitable transfer of new technologies and concepts into the factory environment. Innovative systems for factory automation are continuously tested, further developed and supplemented, taking a complete production system that is typical for industry as an example. Consequently, the *SmartFactory*<sup>KL</sup> functions as an interface between research and the real industrial world. It consists of a procedural section for manufacturing soap and a packaged goods process for filling and labeling.

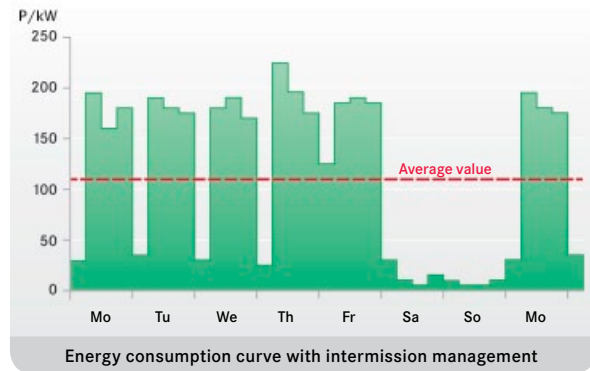
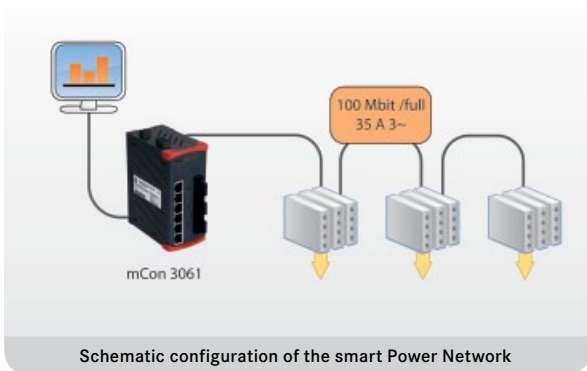
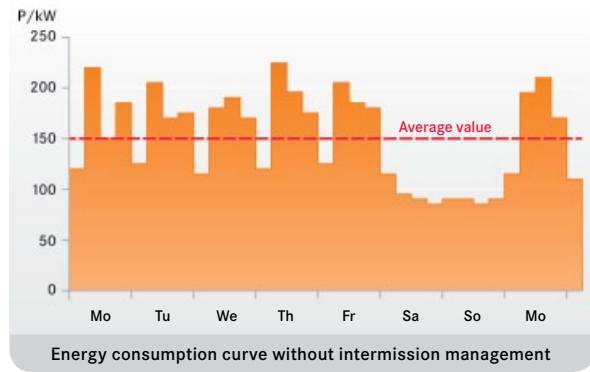
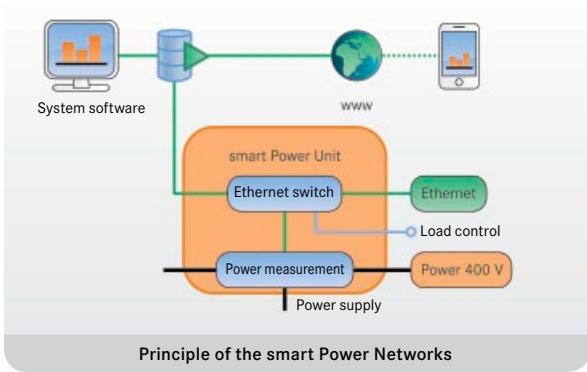
In order to make these industrial processes as efficient as possible, the technology transfer includes carrying the smart grid idea over into industry. In the framework of its cooperation with the DFKI, the **HARTING** Technology Group has introduced the smart Power Networks technology into the *SmartFactory*<sup>KL</sup> in a manner that

closely matches real world conditions. The classic power distribution is functionally supplemented by smart Power Units and system software. The original power distribution topology is retained, and is intelligently introduced into the smart Power Networks.

Technology implementation in the *SmartFactory*<sup>KL</sup> is the evaluation of customer value.

In functional terms, the smart Power Unit consists of an Ethernet switch with integrated data storage and controllable outputs, as well as inputs for the corresponding energy consumption measurement devices. This unit is to be supplemented with power supply and distribution. Condition monitoring functions, such as topology recognition, wiring system visualization,





condition monitoring of the power wiring system and profile comparison within the framework of the machine system's power consumption are integral components of the smart Power Networks.

The Ethernet network components allow a widely developed and established network management system to be used, which results in transparency and continuity in administration. The Ethernet switches acquire measurement data concerning the energy consumption, for example, at the building or machine system's supply devices. The collected data are then transported via Standard Ethernet. In view of the fact that the majority of system segments, machines, and automation cells are integrated into the company-wide networks today, no additional network nodes are needed. The information collected in the switch can be provided to a web server application and/or energy management software, as well as to various other business applications, via the Ethernet network.

The use of a convergent infrastructure calls for „new thinking“, because the system modules that were formerly proprietary and consequently assigned to a single application are now used by many applications. The **HARTING** Dashboard includes a standardized

software tool which offers both, the network view of these modules and a view focused on the energy consumption. This allows users to gain an individual view of the smart infrastructure that depends on the particular application.

A standardized Ethernet network infrastructure is the optimum in terms of function and cost.

Increased efficiency depends on integrating different applications into the production processes. The *SmartFactory<sup>KL</sup>* shows how the automation of production, facility management (such as lighting and climate control), but also energy conversion (such as from electricity into compressed air) are interrelated in an energy correlation. One of the possibilities for increased efficiency is intermission management in machine systems. This involves switching off consumers that are not needed, such as cooling and heating coils, drives for conveyor belts, lasers, etc., in coordination with the process when there are planned or unplanned system standstills.

# smart Power Networks as industry's smart grid

Manufacturing companies currently view the subject of energy generally from the perspective of procuring energy, because energy is responsible for a considerable portion of the costs. Consequently, the most important task of energy controlling is to reduce the primary energy demand.

The value-adding business processes are often neglected here. But, **HARTING** is committed to integrating process-related energy saving options.

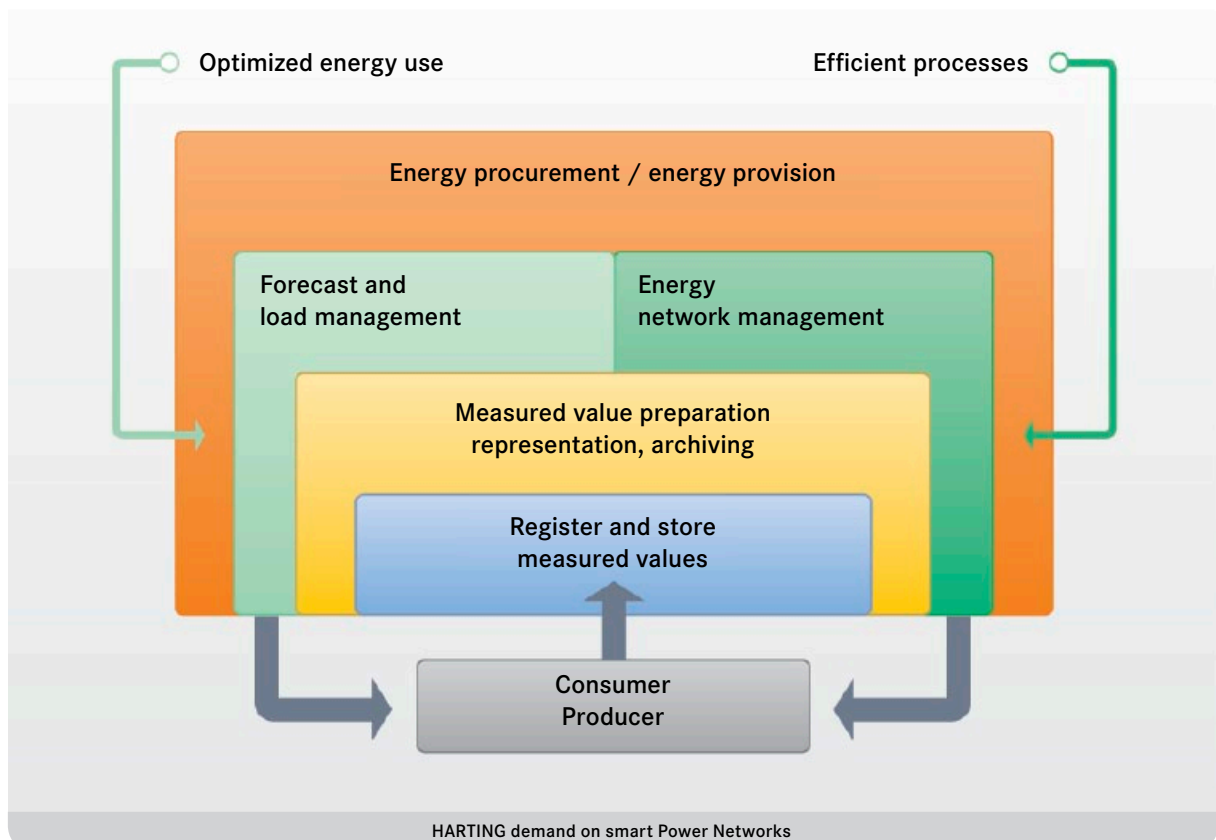
Sustainable energy deployment should involve the long-term improvement of energy use and the efficiency of the overall business process. But this can only be achieved if new structures are introduced to the supply, distribution, and consumption systems. What is introduced in the power supply network as the smart grid needs a counterpart in the form of smart Power Networks in industry, because for example the German government's modern energy policy is pushing the

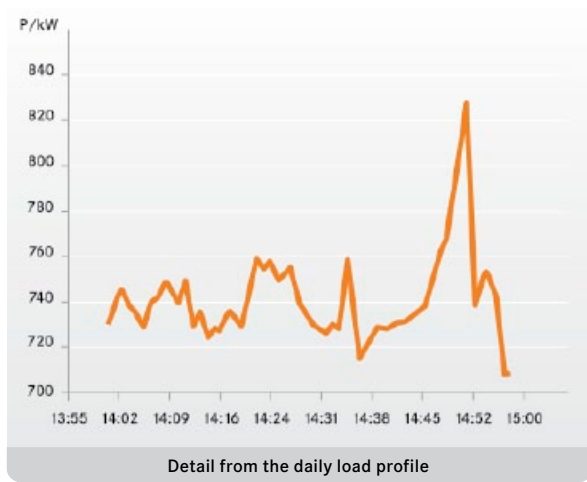
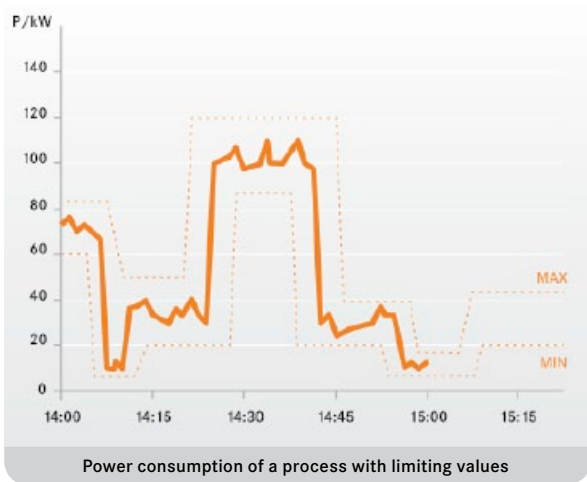
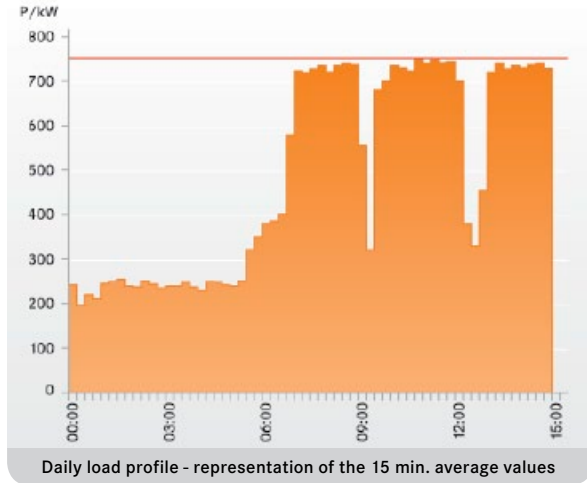
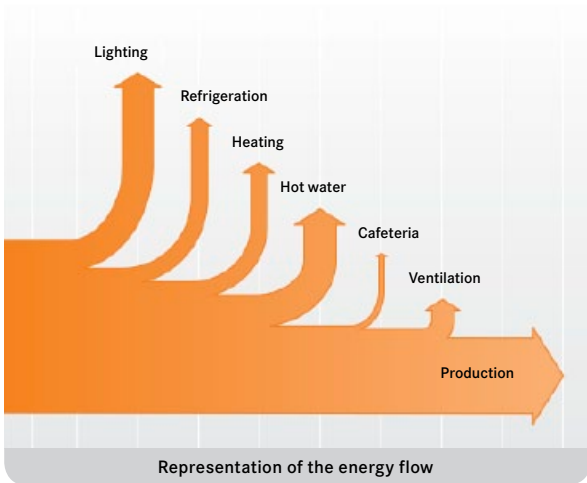
decentralization of power supply. Intelligent energy management is called for in which classic system components make their contribution with new functions. This trend is further promoted by energy cost pressures and statutory impositions (such as certification to DIN EN 16001/ISO 50001).

**HARTING** sees saving energy and using it efficiently - while increasing the availability - as the main task of a state of the art energy management system.

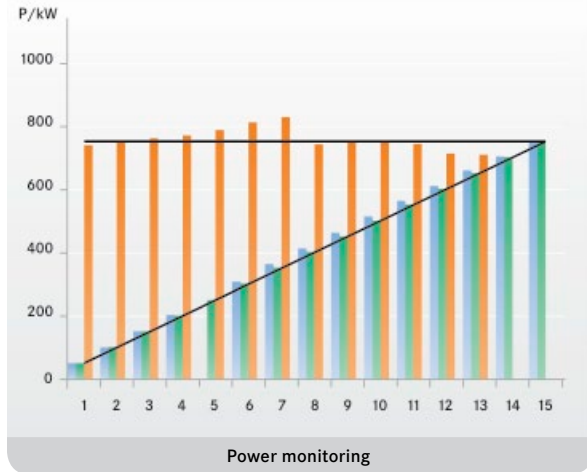
Both, the control of energy flows within a group of users and the maintenance of the energy supply are elementary components of the **HARTING** approach.

In smart Power Networks, **HARTING** combines components based on the mCon switch series that feature additional energy-related functions. Measuring devices for types of energy other than electricity, such as for thermal energy, can be included in the future. The





coordinated control of the energy flow of a number of processes in order to optimize the system as a whole is an additional factor. Data regarding the energy flow are stored, prepared, and communicated. The goal is to support customers in a precise process analysis that is the basis for optimizing the energy use. The group data analysis allows the combined examination of the total energy flows and the control of individual consumers. In the smart Power Network, the smart Power Unit handles the function of the Smart Meter in the industry's Smart Grid. The technological innovation of the smart Power Units lies in the consolidation of the latest Ethernet technology with interfaces to classic measurement and consumption registration in one module featuring an open design.



The convergence of business and manufacturing processes allows comprehensive energy management, while also advancing process optimization.



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