

# Efficient use of energy

DIN 16001

Efficient energy use was the focus of a “Production-based energy management” expert conference recently organized by **ProLeiT** company. Participants were familiarized with options for the implementation of an energy management system in accordance with DIN 16001 in existing plants

Dr.-Ing. Winfried Ruß, associate Professor from the faculty of Raw Materials and Energy Technology at the Technical University of Munich fascinated the audience with “16001”: This number represents the current European standard which governs the introduction of energy management to companies.

“What is so special about this standard is that companies have to continuously and sustainably improve their use of energy independent of which type of energy,” said Mr. Ruß. This approach has to be confirmed by an internal audit to be organized once a year. Efficient energy use

is thus becoming a core company target and will be an essential criterion for the assignment of state grants.

## Transparency of costs

The utilization of renewable resources for energy production has limits. “Those who have not concluded long-term contracts for the supply of renewable resources have no other option than to invest in more energy-efficient production environments because cultivable land is limited”, Ruß emphasized.

The DIN EN 16001 standard supports companies in just this approach: It provides transparency with regard to the energy consumption of individual plants, analyzes the production process for various products and identifies potential for improvement.

“The improved efficiency ratio of steam generators, the substitution of fuels by renewable energy sources and also optimized compressed air generation and refrigeration all provide significant potential for efficient energy use,” explained Winfried Ruß. Compressed air in particular is the most expensive type of energy because only 5 % of the energy used will ultimately

## Heat losses in waste water

Dairy plant – annual production of 3 million pots of yogurt and dessert p. a.

**Waste water volume:** 192,400 m<sup>3</sup>/a

**Waste water temperature:** Ø 43 °C

**Fresh water temperature:** Ø 10 °C

The heat contained in waste water is equivalent to 738,000 litres of fuel oil!

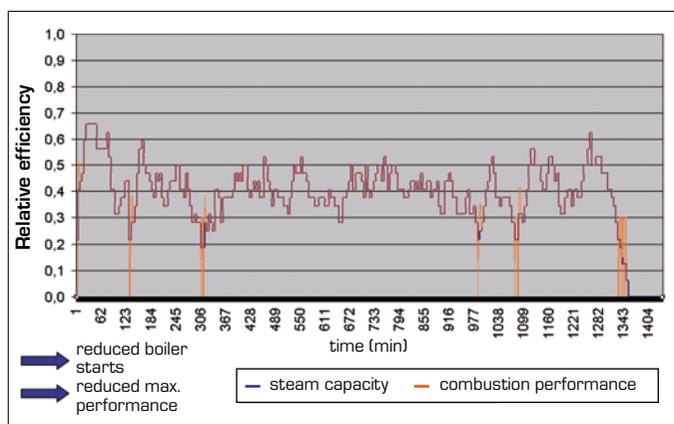
Source: Dr. W. Ruß

be converted into power. The use of waste heat has proven particularly efficient.

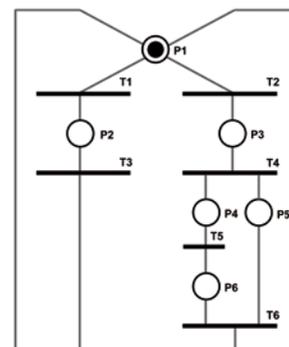
Dr. Ruß quoted two examples in order to demonstrate that the waste hot water from an average dairy provides the same energy as more than 700,000 liters of fuel oil/year. Those who have implemented an energy management system already today are particularly well equipped to evaluate relevant measures, Dr. Ruß continued.

## Consistent monitoring of data

According to Stefan Stenzel, ProLeiT, precise and complete data acquisition is in princi-



Patri net, 6 stations, 6 transitions, 1 marker



Source: Christian Schweiger

Fig. 2: Boiler capacity without (left) and with (right) production planning (source: Dr. W. Ruß)

ple a major prerequisite for the assessment of energy consumption values. But the problem in existing plants is the diversity of sub-plants based on different automation systems, different counting devices and proprietary interfaces. Since, in most cases, the expected ROI cannot compensate the retrofit costs, the data model of the energy management system must allow mixed acquisition. For example, the direct read-out of electricity meters and the saving of load profiles are essential in this context. ProLeiT's Plant iT provides the standard modules required for these purposes. After all, delivery meters for the consumption of process water, carbon dioxide or hot water for cleaning processes deliver their measured values to the process controllers anyway.

In addition, the counters installed at the different process stages of production, filling and packaging must e. g. be read offline using a PDA system. Based on this data, Plant Acquis iT creates standardized data records which are saved in an SQL server-based realtime database. At the push of a button, the data can be exported into an Excel-readable format.

Production managers therefore have the option of initiating shift-, order- or batch-related requests and issuing daily, weekly, monthly or annual reports. Based on the corresponding characteristic numbers, even particularly detailed issues can be traced within the individual plant sections or machines. The Plant Acquis iT web interface allows the user to write platform-independent reports on the different energy balances.

### Installing an energy management system

Roland Riedl, head of ProLeiT's dairy division, reports that depending on the product range, energy costs account for ~1.5 to 5% of a dairy's annual turnover – for large groups, these costs can reach amounts in the range of tens of millions of euros. Savings in the fields of electricity, cooling, compressed air and lighting have an immediate positive impact on the financial figures. "In most cases, the savings potential cannot be determined at first glance," explains Riedl. Some actuators are difficult to influence, and certain measuring equipment urgently needs replacement, or individually wired communication paths are inefficient. In these cases, the entire company must be carefully scrutinized and obsolete equipment modernized accordingly. Progressive migration provides the operator with the option of recovering the heat produced by plate or tube heat exchangers and separators and spray towers, of controlling the speed of compressor drives during operation, and further promoting automation. "Thanks to an energy management system, losses can be controlled more effectively and a comprehensive automation solution for all plant sections from milk receivals up to filling can be established," explains Roland Riedl. The PLCs capture data for storage in an SQL database, and clearly arranged Excel sheets provide the operator with a precise overview of consumption values and losses. With Plant iT, changes in process sequences can be configured based on a structured approach and implemented with minimum production downtimes. "If data is visualized accordingly, it is easy for a company to convince its employees to utilize potential and to design processes as efficiently as possible," Roland Riedl summarized.



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