

Sustainable success
with zenon in Resource and
Energy Management



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Introduction

In view of the global energy situation, a strategic challenge for every company is the sensible handling of resources. Climate protection has become a central point of public attention and CO₂ emissions, dwindling resources and energy costs are fundamental criteria for strategic business decisions.

There can be various motives for having a strategic corporate orientation towards sustainable energy policies.

- Energy prices are continually rising: an increase of 25% since 2005.
- A corporate philosophy which includes a sustainable business orientation.
- Increase production efficiency: Material and energy consumption are reduced, production output is increased whilst production time is decreased. Thus, competitive advantages are boosted.
- Legal requirements and standards such as the ISO 50001: Germany has set the goal of sinking its CO₂ emissions by 40% by 2020 compared to the figures of 1990. This goal cannot be reached without a huge increase in energy efficiency. This is why EU-wide standardized criteria for an Energy Management System were established. Implementation of these norms are often financially supported by the government.
- Taking social responsibility for employees: So, for example, the production cannot be set for nighttime. Even though energy prices would be cheaper it would lead to considerable pressure on the staff.
- Climate change: our responsibility towards the future generation.

There are numerous ways of saving energy and using it efficiently. Whatever method one decides on – prerequisite is always the collection of detailed, up-to-date information on energy consumption and its costs. To keep an overview of this process an Energy Data Management System (EDMS) is vital.

A EDMS supports a company in the following ways:

1. Collection of energy data
2. Reduce energy consumption of facilities
3. Increase of equipment efficiency
4. Provide figures for energy controlling
5. Evaluation of deviations to secure error-free energy provision
6. Monitoring data of new and existing equipment

These underlying principles make it clear how important it is to measure, collect, process and analyze consumption and production data. The central instrument here is an Energy Data Management System (EDMS), which covers all hardware and software components: from the energy consumption meter right up to software reports. The zenon Product Family has already proven itself as the centerpiece of an EDMS during running operations. Our 20 years of experience in this sector shows us that only an open and consistent system, such as zenon, is optimally prepared to take on this task.

With zenon you are ideally equipped for these demands.

Secure information flow is the key factor for success

Data gathered from the process are the foundation which the evaluations are to be based upon. Trouble-free integration to various data collection systems, sensors or DDCs is required here. A quick and secure data transmission is a prerequisite for an efficient EDMS. With its over 300 drivers zenon offers the perfect connection to any desired system for every application. Drivers for IEC 61850, IEC 60870 protocols or DNP 3 are also available. Data from all resource consumers, such as electricity, compressed air, water, oil and gas are quickly, simply and securely collected. Various systems can easily and flexibly connect by way of zenon`s multi- driver interface.

The more data is collected, the larger the range of informative analyses. Crucial is also the robust data communication as well as fully developed diagnosis mechanisms. Because it is only use of accurate data that guarantees a correct analysis.

The integrated, seamless zenon redundancy offers further data security and guarantees system availability. Because of the hot-standby function from zenon`s redundancy, data will not be lost even if a server is down. The system is fully available, even in such stress situations and still reliably delivers data for analysis.

The delivery of all data administered in zenon to common SQL databases increases data transparency. Furthermore, bidirectional data or commands can be transferred from the ERP level through the fully integrated, certified SAP interface.

The various zenon editions are compatible with all current Windows operating systems. The development tool zenon Editor is thereby put to use at all levels of the production process. zenon can be implemented on-site at control panels with embedded or CE operating systems, as well as at SCADA and control technology levels with Office operating systems. Additionally, zenon can be used in data processing centers which have their own server operating systems.

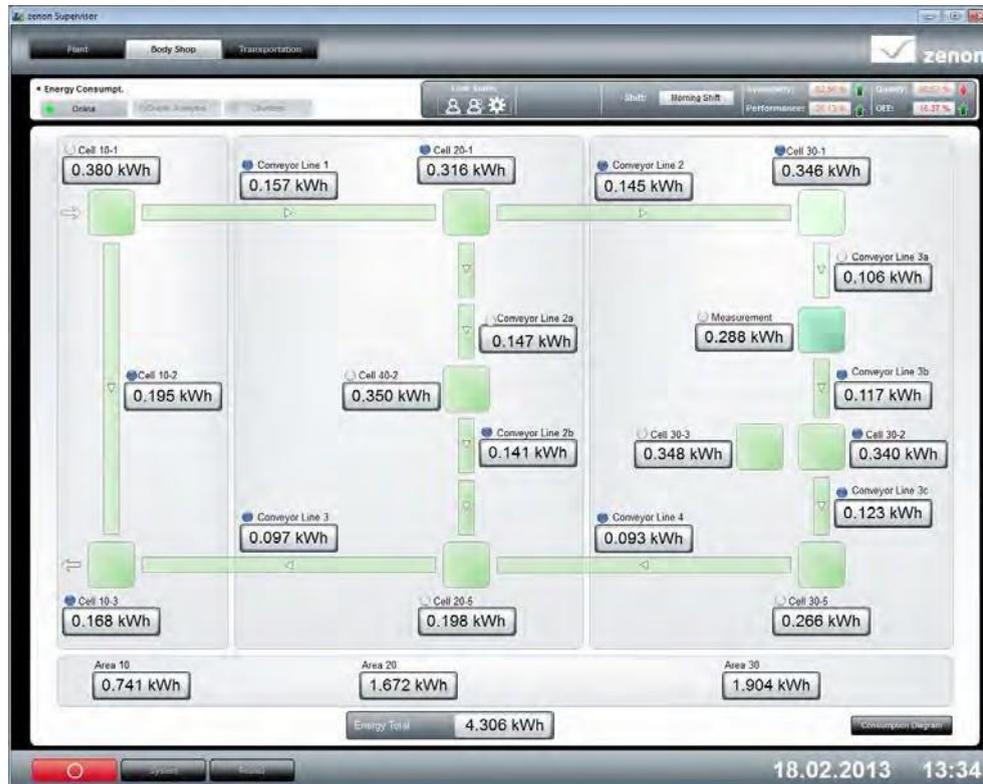
Only one system is needed, as zenon equally covers all the mentioned platforms. This reduces investment and training costs and enables simple system maintenance and service.

The data is available, what now?

All collected current measurement values can be displayed for monitoring in various visualizations. In these overview windows the current system status is visible at a glance. Further information can be displayed by connecting detail screens.

Operating conditions of various equipment parts such as "light on" or "valve open" can be displayed with various screen symbols or colors. Current energy or water counter values are displayed and monitored in the corresponding equipment scheme.

The data is available, what now?



In the screenshot example of an online representation, energy consumption for each production step is visible. The total consumption of the entire equipment calculated online is shown in the lower area of the monitor. This value is used simultaneously for validity checks. The calculated amount of the individual consumers is thereby compared to the total measured consumption. If there is a deviation of both values then a counter failure within the system is assumed.



The dynamic bar of current energy consumption recognizes deviations within the systems at a glance.

Furthermore, in addition to the online data of counters KPI ("Key Performance Indicators") figures are calculated and displayed. Such a figure denotes the equipment effectiveness, also OEE ("Overall Equipment Effectiveness"). This is comprised of availability, performance and quality. By having a continuous display of relevant figures, equipment operators are able to react quickly if indicators get out of hand.

Have control if the unplanned should happen

Unexpected events such as alarms can influence effectiveness tremendously. The continuous monitoring of errors and alarms is therefore an important component of an Energy Data Management system. If errors and their causes are quickly determined or reacted to rigorously, then a resource-conserving, high productivity level is ensured. All currently queued alarms and errors are displayed in the zenon Alarm Message List. Various logical groups and priorities are formed to create an overview display.

The limits which trigger an alarm can be designed dynamically. For example, limits can be placed so that they already trigger an alarm outside of production time when a hydrocele of 1 m³/h occurs, and in production this would not be triggered until 20 m³/h.

Additional information can be linked to the messages, such as handbooks for example. The user then receives further detailed information and can react quickly and precisely.

By reacting to messages and alarms quickly you can avoid expensive downtime and ensure that the effectiveness of equipment remains high. The zenon Message Control can support here. It automatically informs operating personnel and decision makers of acute incidents, by E-Mail, SMS or voice message.

Flexibility at all times

Using the zenon factory calendar, the "Production & Facility Scheduler", you can control plants and equipment precisely according to time, events and production status. Equipment with large consumption quantities can thereby quickly achieve substantial energy reduction. The users can be filtered according to shift using the factory calendar. For example, heating can be turned up to a higher set value two hours before production begin and lowered one hour before production end. If the production shift times change then the switching points will automatically adapt to these.

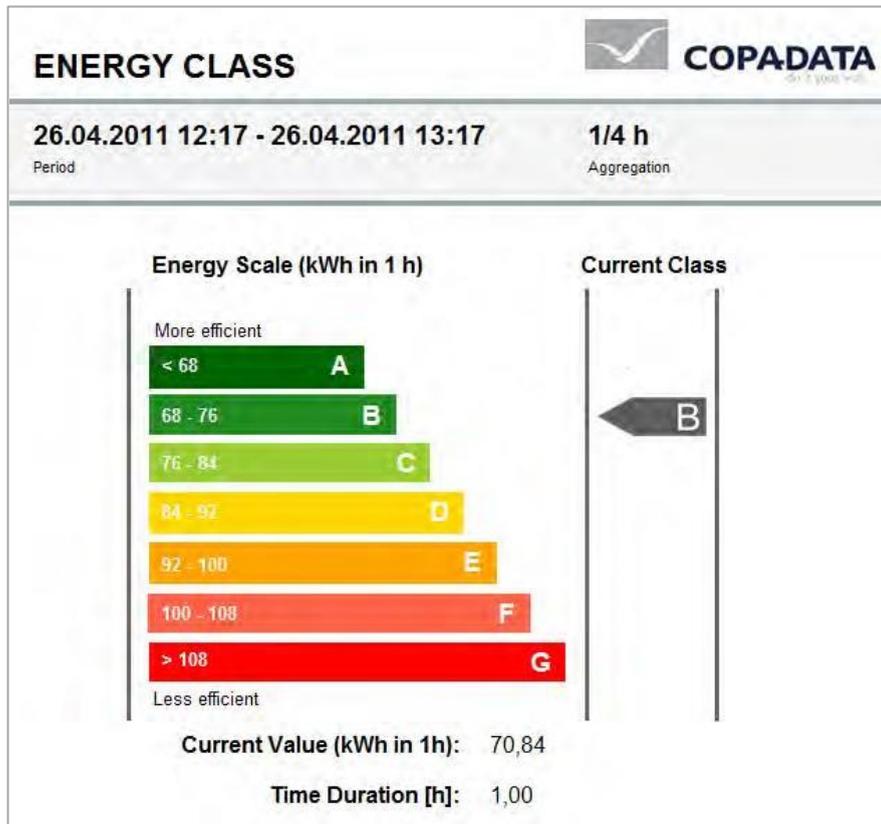
The zenon Archive Server records process data on a lasting basis and archives it as desired. The recording of values can take place cyclically for value changes or it can be event controlled. For continuous logging purposes, data can be compacted through aggregation, minimum, maximum and mean values. Data outsourcing in SQL databases is supported. Therefore all values are transparently made available, with a source time stamp, for further processing.

A picture says more than a thousand numbers

Historic data can be displayed, clearly scaled as trend curves. For data analysis there are a choice of filters, scroll or zoom functions. Details regarding specific times can be determined with a work blade for recording types. Statistical sizes such as maximum, minimum, mean value or standard deviation can be displayed for time ranges and can be freely chosen by the operator. Operating states are visualized in the Gantt display as colored bars. Therefore relations between operating states and measured values are visible at a glance for optimization. The connection between a stop and its repercussions on the figures and consumption are thereby in focus.

For a comprehensive reporting system the zenon Analyzer comes into play. Pre-defined reports of high graphical quality can be called up in the browser. Analysis is simplified for the operator by flexible filter mechanisms. In parallel, reports of this kind can be created automatically in the background and distributed by email or in the intranet.

For data analysis diverse reports on the application are prepared and consigned to zenon Analyzer. At the press of a button consumption analysis of chemicals, water or energy, in the form of bar charts or tables, is displayed. Comparison analyses are carried out with reports displaying data from two periods or different areas.



Reports for energy related representation (as in the graphic above) show, at a glance, the performance category of current users as well as the complete system.

Energy optimization: Reduce costs and gain potential

For reduction of energy costs the average mean value in an operation needs to be kept as low as possible. Peak loads should be avoided here.

The zenon Load Management automatically observes the Energy supply agreement. On the basis of collected data, forecasts for a defined timespan are calculated and therefore enable timely reactions. In the case of a rule violation energy generators can be activated or consumers deactivated. These actions can be automatically performed by the system or as a switch recommendation for the user, in order for him to be able to operate the system manually. These switching operations take place according to primary and secondary deciding factors. Primary deciding factors can be current, dynamically scalable energy consumption amounts. Equally, the necessary availability of the complete system influences this decision. Here the availability can take place dynamically dependent on production times. Amongst the secondary deciding factors are machine-specific properties such as suspension lock-out or enabled times, shift frequencies or shift priorities.



All information from this system which is based on zenon can be directly transferred to superimposed ERP systems such as SAP. Production data can be quickly and economically processed and requirements specified in the ERP system can be implemented directly at process level. The certified zenon SAP interface sends measurement values and counter readings cyclically to a SAP system. Any messages that have come from the process are transferred in an event triggered form. The superimposed SAP system can return the corresponding actions or commands back to the zenon system. The data flow from the field level right up to the ERP level is thereby continuously guaranteed.

zenon – Your companion for ISO 50001 certification

zenon supports your Energy Management System in a variety of ways. When you decide to have your company certified according to ISO 50001, then zenon is your perfect companion.

- The zenon Product Family achieves an extensive plant data collection, which includes Energy Data Collection, amongst other things. The collection is automated, seamless and detailed.
- zenon Supervisor and zenon Analyzer offer a simple overview of the ascertained data, figures and trends.
- The flexible and simple integration possibilities of zenon allow specific requirements to be quickly and easily implemented.

Cost-effective flexibility is an aspect of the zenon product philosophy and therefore an underlying property of zenon based systems. This is crucial, especially in the case of an EDMS which is a component of a continuous improvement process. The zenon development environment is characterized particularly by "setting parameters instead of programming" as well as out-of-the-box modules and a high level of user-friendliness, where functionality updates for an EDMS are efficiently made possible. The addition of an extra measurement counter, an additional calculation or a further operation report has little impact on the overall investment.