

Energy management in the plastics industry - Auditor experience

A standardised template for audit reports ensures that standard-specific requirements are met. But it also offers the trained eye a quick comparison of system maturity, implementation methods and company specifics.

GUTcert took a close look at several audit reports to see how companies in different sectors are developing in relation to the challenges of energy management systems (EnMS). Of particular interest was what added value the audit brings to the client.

Plastics industry as innovator

Behind the designation "Scope 14", in the language of the certification companies, are the [plastics-producing and plastics-processing companies](#). Whether film products, compounds, granulates, blow-moulded parts or other: the plastics industry supplies customers in the construction, automotive, electronics and furniture industries, agriculture, the food industry, petrochemicals and medical technology.

Meanwhile, the industry is one of the most innovative and successful in Germany. With a total turnover of 201 billion euros ([2018, Statista](#)), the German plastics industry successfully serves national and international customers despite strong competition. A [ZEW study](#) on the "Proportion of companies with cost-reducing process innovations in rubber and plastics processing in Germany from 2008 to 2018" confirms this. The study focused primarily on those process innovations that led to a reduction in average costs per unit or per process. In 2011, the industry showed a record share of 35% of innovation-friendly companies, in 2018 it is still a proud 21% - and the search for optimisations continues.

At the same time, the problem of plastic waste keeps the plastics industry on its toes - all players are constantly looking for new solutions. And so, according to the interviews conducted during the audits with the representatives in the industry, dealing with sustainability issues is also quite common among customers and clients. This applies on the one hand to products, where the reduction of weight and thickness of the products, the use of recyclates and waste from renewable raw materials and high recyclability are considered. But the focus is also on production, for example the purchase of green electricity, the reduction of CO₂ and other emissions or the reduction of waste.

All this contributes to the expansion of existing management systems: The classic and indispensable [quality management](#) and the tax-advantaged [EnMS](#) are being supplemented, for example by [environmental management systems](#), and [sustainability reports](#) are increasingly being written.



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Ways to an energy management system

The different sectors also come to the certification-ready EnMS from quite different directions: energy-intensive companies have been on the path since 2011 with ISO 50001 for tax reasons. Other large players with lower energy consumption in production initially opted for the requirements of the [SpaEfV](#) in 2013 and were only certified according to ISO 50001 from 2015. And some SMEs remained with the EnMS "light" - with testing according to the SpaEfV.

Results of the report analysis

The analysis of the reports clearly shows that in 2019, all companies have developed a high level of technical competence and good knowledge in relation to the technical systems - irrespective of a path to a certified EnMS according to ISO 50001. This is illustrated by the following observations:

Clearly defined balance limits and energy flows as well as constantly updated plant registers are part of the reality of the audit.

Energy-relevant operational processes are recorded, evaluated and controlled by means of procedural, operational and work instructions, and transferred into the daily routine of the employees.

The detailed communication of all responsible persons during shift handovers illustrates the effectiveness of the EnMS in all the reports examined: whether it is a matter of resource use or energy efficiency - the important things are not forgotten.

- ▶ Production is very energy-intensive, although the number of main energy consumers or main consumer groups (Significant Energy Users, SEUs) is usually not very high. SEUs are mainly production machines, e.g. injection moulding machines or extruders, air compressors, refrigeration systems and lighting.
- ▶ All evaluated reports show a high degree of metrological coverage of SEUs, which is largely due to the requirements of ISO 50003 on metrological transparency as the basis for certification testing.
- ▶ The use of software-based energy controlling has increased considerably over the last ten years. However, the auditors' advice is often important at this point: the rapidly developed energy master data must also be evaluated in order to create the promised transparency and a basis for further optimisation. "Data cemeteries" are harmful for companies - both economically and in terms of the motivation of those responsible. A constantly growing mountain of data without a smart evaluation system is overwhelming. Less data, but meaningfully defined, is more effective than "more and more" measurement data. Many potentials have been uncovered and developed over the years.

Top 6 Optimisation measures

The most frequent improvement measures in the plastics industry in recent years reflect the picture of positive developments of SEUs:

Acquisition of new production machinery as a replacement or for the purpose of expanding production.

- ▶ Changeover to a new technology



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- ▶ Optimisation of air compressors
- ▶ Use of WRG technology
- ▶ Optimisation of refrigeration systems
- ▶ Conversion of the hall lighting to LED

Potentials and challenges

A management system always follows the principle of continuous improvement of the system itself and, above all, of the performance achieved. It goes without saying that one can be proud of the successes achieved - but one should not rest on one's laurels for too long.

The majority of the evaluated audit reports show the greatest potential for improvement, especially in the definition of specific energy performance indicators (EnPIs) and the adjustment of energy bases (EnB), which reflect the progress of the company under constantly changing conditions (order situation, use of raw materials, quality, etc.). In 2019, evidence was generally provided through the plausible and comprehensible presentation of the improvement in energy-related performance (EEP) via individual measures. The kWh saved were checked in the audit and recorded in the report.

However, when defining higher-level EnPIs, which are primarily used for operational control and commercial monitoring, the product quantity remains decisive: kWh per tonne, kg or a running metre are usually the reference for energy use when reporting, especially to the management. This use of EnPI, which has been stuck over the years, is therefore sharply criticised by the auditors: constantly changing heterogeneous production ranges and other aspects such as the often far too high base load of the site or insufficient normalisation of the initial bases from year to year may distort the decision-making basis for further sensible investments and innovations.

The focus in the analysis and subsequent target setting should therefore be directed towards individual consumer groups with defined and normalised relevant variables. Quantitatively determining the influencing factors is still a challenge. As the industry's production increased in recent years, specific consumption decreased without determining the influence of utilisation as a variable and adjusting the ebL for this factor.

Moreover, several variables are relevant at the same time, which is a difficulty that companies can hardly cope with alone. It would be desirable for customers and end customers to change their buying behaviour, because a lot of value is still placed on "high gloss". Foils or plastic packaging are often produced with unnecessarily thick walls or films, as this makes the product appear more robust and valuable. However, this impression is very subjective. Nevertheless, the understanding for sustainable management is growing, albeit slowly.

The second forward-looking point of criticism from the auditors clearly lies in the further development of the measurement and verification process. Not all action plans are filled with the details of planned before/after measurements and the method of verifying success. For the certificate, fewer measures with complete information are sufficient, for the internal economic analysis rather not. The purpose of a management system is to improve the competitiveness of the user in combination with the fulfilment of legal and political expectations of the stakeholders. Therefore, further development of the verification of results and the economic analysis can only bring advantages for the company.



Conclusion of the analysis

The EnMS development trend for the next few years lies primarily in a fundamental shift away from reacting to external circumstances towards conscious control of technical systems - based on the energetic optimum under changing conditions. In addition, a quantitative adjustment of performance and verification of progress will become indispensable. What does added value mean in the audit? An important guiding principle of GUTcert is "creating added value for our clients". This means that the client should benefit from the auditors' wealth of experience.

The difference with consultancy is that our auditors do not offer direct technical solutions, but ask the right questions to point the client, who is himself an expert on his system, in the right direction for further optimisation. Refining the system elements means making them more and more efficient and effective over time. And discovering new technical possibilities for increasing energy efficiency is always an added value.

Even if our auditors are commissioned by the client to audit an EnM, they are always required to provide information on environmental protection, occupational safety or process optimisation in relation to quality management, for example. Since these aspects are outside the actual mandate, the following information often appears in the audit reports:

Improved metrological transparency and an intensive examination of the influence of various relevant variables in the EnMS often allow an indication of the optimisation of QM-relevant processes and specifications. Often, the indications concerned, for example, the possibilities for reducing waste in the production lines.

Every company is obliged to comply with the law. However, there is no universally suitable system for monitoring compliance on the market. It is up to the company itself to set up a customised concept. Our auditors have the qualification profile to have the system-related legal knowledge and are happy to give advice on the relevant legal regulations that may still be missing or on how to improve implementation at the customer's site. This includes, for example, information on the legally compliant storage of hazardous substances and the presence of safety data sheets in the storage rooms; increasing the degree of reflection of the walls and visual elements in the roller shutter doors with regard to occupational safety or ensuring the requirements of data protection and information security for the field service.

This is the motto that GUTcert has also adopted for itself:

Getting better and better ...

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