



Best Practice	IMPLEMENTATION OF AN ENERGY MANAGEMENT SYSTEM ACCORDING TO ISO 50001 STANDARD	ENMA-03
Application	Energy management	
SME sector	All	
SME Sub-sector	All	
Technical description	<ul style="list-style-type: none"> <li>• <b>Energy Management: from informal approaches to formalized systems</b></li> </ul> <p>Referring to energy management is often taken identical to introducing a fully-fledged energy management system according to ISO 50001. Yet energy management as a general term can be perceived more broadly running and well-maintained production.</p> <p>Experience shows that in SMEs in particular, the topic is driven by individuals who are interested in keeping a smoothly. Thereby, they also look on energy demand among the various aspects related to running the operation, even without relying on a formalized energy management system. Larger companies, on the contrary, need to rely more on structured energy management systems due to the distribution of specialized tasks and responsibilities within larger organizations. Input by third parties within energy audits can also be valuable to get a neutral and better understanding of the energy saving opportunities within a company.</p> <ul style="list-style-type: none"> <li>• <b>Energy audit</b></li> </ul> <p>The general nature of an energy audit is that it is typically designed as a one-off intervention. Energy auditors check on the energy flows, identify major energy consumers and compile a report with recommendations for reducing energy demand.</p> <p><i>Energy audits are “a systematic procedure with the purpose of obtaining adequate knowledge of the existing energy consumption profile of a building or group of buildings, an industrial or commercial operation or installation or a private or public service, identifying and quantifying cost-effective energy savings opportunities, and reporting the findings.”</i></p> <ul style="list-style-type: none"> <li>• <b>Energy management systems: a framework for regular reviews</b></li> </ul> <p>As compared to the energy audits, energy management systems are more comprehensive approaches that seek to integrate energy-related issues in the management system of an organization. Usually, these management systems follow the structure as laid down in ISO 50001 series. Their elements are based on the plan-do-check-act (PDCA) cycle, i.e., a continual improvement process. The entire system</p>	



	<p>seeks to establish an energy policy, an energy planning and an implementation within the organization and a regular review of the achievements (see also illustration).</p> <p>Due to the continuous approach to energy related-matters, energy management systems are usually more sustainable in terms of the achieved savings in the longer run. Yet it also has to be kept in mind that the management framework has to be filled with “life” to get beyond a mere certification issue. Estimations on the actual effects and benefits of energy management systems vary, e.g., depending on organizational structure and prior activities in energy-related issues.</p> <ul style="list-style-type: none"><li>• <b>Energy benchmarks: managing energy by comparisons</b></li></ul> <p>The general idea of energy benchmarks is to allow comparing energy demand values of objects to derive helpful conclusions about their energy performance. In one of the simplest of cases, the consumption of two identical lines with the same product is compared to each other. If there are differences in their energy consumption values, this could be an indication that a more thorough investigation on the differences is needed. While this general idea is appealingly simple, there are many challenges in the details. Identical lines with the same outputs are rather the exception than the rule and many factors affect the overall results including:</p> <ul style="list-style-type: none"><li>- Product-related factors (e.g., number of pieces, weight, length, volume, material)</li><li>- Organizational factors (e.g., shift models, staff at site, frequency of energy analysis)</li><li>- Process-related factors (e.g., operating time, cycle time, speed, number of different setups, quality rate)</li><li>- Personnel (e.g., user behaviour, intensity of instruction and education, presence of specialized staff members)</li><li>- Ambient conditions (e.g., external and internal temperature, humidity, pressure, light)</li><li>- Location-specific factors (e.g., area, space, refurbishment, age of equipment, status of supply infrastructure)</li><li>- Production structure (e.g., degree of vertical integration, product segments, number of different products)</li><li>- Economic factors (e.g., turnover, production costs, energy costs)</li></ul> <p>Such factors have to be considered for meaningful comparisons. In practice, this can be challenging, especially when the number of details or knowledge about the factors is limited. Helpful benchmarks can therefore be quite difficult to establish, yet if properly done, they are valuable to better understand performance issues.</p>
<p><b>Recommendation for optimisation</b></p>	<p>To set up a management system according to ISO 50001, the company must in particular:</p>



	<ul style="list-style-type: none"> <li>• proof that management demonstrates its commitment to continuously support and improve the</li> <li>• efficiency of the EMS through the implementation of its energy policy</li> <li>• appoint an Energy Manager, set up an energy team (trained to the standard), and provide the</li> <li>• necessary resources (human resources, specialized skills, technological and financial resources, etc.)</li> <li>• identify the legal requirements and provide proof that it has verified its compliance with the texts applicable to it.</li> <li>• develop its energy review and thus determine all its significant energy uses.</li> <li>• set up a measurement plan, with periodic checks of measuring and recording devices</li> <li>• identify relevant factors that have a significant impact on energy use</li> <li>• build an action plan to achieve targets and objectives</li> <li>• consider opportunities to improve energy performance in its purchasing policy when replacing equipment or installing new systems that can have a significant impact on energy performance</li> </ul>
<p>Relevant technical considerations</p>	<p>The goal of ISO 50001 is to enable all companies to achieve continuous improvement of their energy performances through careful management.</p> <p>It is based on the continuous improvement methodology known as PDCA (Plan-Do-Check-Act) and integrates energy management into the company's daily practices.</p>
<p>Schemes and diagrams</p>	<p>The diagram illustrates the PDCA methodology for energy management. It features a central circular arrow labeled 'Checking'. Above the circle, a vertical stack of boxes contains 'Energy policy', 'Energy planning', and 'Implementation and operation'. To the left, a box labeled 'Management review' has an arrow pointing to 'Energy policy' and another pointing to the 'Checking' circle. Below the circle, two boxes are connected: 'Internal audit of EnMS' on the left and 'Nonconformities, correction, corrective and preventive action' on the right, both pointing towards the 'Checking' circle. To the right of the circle, a box labeled 'Monitoring, measurement and analysis' also points towards it. The entire diagram is titled 'PDCA (Plan-Do-Check-Action) methodology' at the bottom.</p>
<p>Economics</p>	<p>Several factors affect investment costs, and a case-by-case assessment is necessary.</p>



Energy savings	5-15%	
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Average Payback Time	Less than 3 years	
Emissions	The measure does not involve any emission.	
Environmental benefits	Reduction in CO <sub>2</sub> emissions	
Main NEBs (Multiple benefits)	<input checked="" type="checkbox"/> Environmental benefits <input checked="" type="checkbox"/> Increased productivity <input type="checkbox"/> Work environment/ Health/Safety <input checked="" type="checkbox"/> Increased competitiveness <input type="checkbox"/> Maintenance	Reduction of energy consumption and its dependence on fossil fuels, improvement of the company's image with its customers or partners, meeting legal requirements.
Replicability	High	
Related measures	<ul style="list-style-type: none"> <li>• ENMA-01: Human resources</li> <li>• ENMA-02: Follow-up of Energy consumption: indicators, energy monitoring</li> <li>• ENMA-04: Contribution of an independent expert for energy management</li> <li>• ENMA-05: Energy purchase: energy market, offers, invoices, green energy</li> <li>• ENMA-06: Regulatory obligations</li> <li>• ENMA-07: Financial support for energy management</li> </ul>	
Case study	<p>Case study #1</p> <p>Introduction of Energy management system at the leading company in the food industry (Spain, 2017)</p> <ul style="list-style-type: none"> <li>• <b>Initial Situation:</b> the main challenge for the ESCO was to reduce the consumption without modifying the comfort conditions of the clients in the supermarket chain shops.</li> <li>• <b>Description of the optimisation:</b> an energy management system was developed and implemented.</li> </ul> <p>Exemplary saving measurement &amp; results from introduction of EMS:</p> <ul style="list-style-type: none"> <li>- Improved vertical display refrigeration management</li> <li>- Optimized bakery oven on/off schedule</li> <li>- Improved lightning technology</li> <li>- Optimization of contracted power and free market terms</li> <li>- Savings verification</li> <li>- Reduction of CO<sub>2</sub> emissions by 34,000 kg</li> <li>- Reduced electricity bill with 37% of saving out of the total</li> </ul>	



	<p>Energy savings from the implemented energy management system and worker trainings were estimated as 78,6 MWh/year (about 7,800 EUR/y).</p> <ul style="list-style-type: none"><li>• <b>Implementation costs:</b> not available</li><li>• <b>Payback Time:</b> not available</li></ul> <p><b>Case study #2</b></p> <p>Energy management in the retail sector, Lidl company (Netherlands)</p> <ul style="list-style-type: none"><li>• <b>Initial Situation:</b> not defined</li><li>• <b>Description of the optimisation:</b> in the Netherlands, the company Lidl has ISO 50001 certified almost 400 of its branch stores, with about 28 employees per store. The most important motivations were cost reduction and energy awareness within the organisation. A key aim was to enhance the company's reputation. The investments required were moderate 12,000 EUR for certification and EUR 4,000 for staff training. The training focused on understanding where and how energy is used, and on quickly finding and addressing problems or equipment malfunctions. The process took three months (four days a week of staff time). This was possible because many processes and procedures were already in place and needed only minor modification to make it applicable for ISO 50001. A key success factor was providing training tailored to the skills and needs of non-technical staff. Energy savings have been 5% to 10% on average (with savings on store level up to 30%), largely due to continual attention to the functioning of the system and rapid response to problems. In the future, energy management-related activities could be expanded to the supply chain.</li><li>• <b>Implementation costs:</b> 16,000 EUR</li><li>• <b>Payback Time:</b> less than 1 year</li></ul>
<p><b>References</b></p>	<p>Dexma, Energy Management for SMES. 2016. <a href="https://get.dexmatech.com/hubfs/Whitepapers/SMEs_EN.pdf">https://get.dexmatech.com/hubfs/Whitepapers/SMEs_EN.pdf</a></p> <p>JRC (EU), Best Environmental Management Practice for the Food and Beverage Manufacturing Sector. 2018.</p> <p>Accelerating Energy Efficiency in Small and Medium-sized Enterprises, IEA, 2015 <a href="https://c2e2.unepdtu.org/wp-content/uploads/sites/3/2016/03/sme-2015.pdf">https://c2e2.unepdtu.org/wp-content/uploads/sites/3/2016/03/sme-2015.pdf</a></p>

This Best Practice was developed by the Impawatt Project (GA No. 785041) and adapted for the GEAR@SME Project (GA No. 894356)