

ISO 50001

Guide to effective energy management with an EMS



Driven by your data

Optimise your energy management with a powerful EMS

In a time where energy efficiency and sustainability are critical, a well-functioning Energy Management System (EMS) is key to systematic energy improvement and regulatory compliance. This guide provides insights into how an EMS supports your energy management and delivers the necessary functions to identify and leverage energy savings.

ISO 50001 is an international standard that sets the framework for effective energy management, including functionality, operation, performance evaluation, and continuous improvement. The responsibility for certification lies with the organisation, while the EMS provider acts as a service partner in the overall performance. This e-book serves as a guide to help you choose the right EMS solution to support your energy management processes (EnMS).

Data collection and energy review with an EMS

An EMS ensures an overview of energy consumption and enables continuous analysis of energy performance. The system collects and visualises relevant data, allowing you to identify energy types, normalise consumption based on weather conditions, and evaluate energy-consuming units.

Combine technology and expertise

A strong EMS provider not only offers a platform for data collection but also provides advanced analytics and consulting. This includes identifying significant energy-consuming units (SEUs), which have the greatest impact on overall consumption – a key factor for effective energy management.

Chapter 1	Requirements of the EU Energy Efficiency Directive.	3
Chapter 2	What is ISO 50001, and what certification requirements must be met?.	4
Chapter 3	Key features of an EMS for ISO 50001	5
Chapter 4	PCDA method.	6
Chapter 5	Is there officially approved software for ISO 50001?	7
Chapter 6	Case study – Coop	8
Chapter 7	A powerful EMS solution for your certification	10

The EU Energy Efficiency Directive

The **EU Energy Efficiency Directive (EED)** provides a binding framework for reducing energy consumption across all sectors, helping Member States and organisations contribute to the EU's climate neutrality goals.

Key requirements from the EED

Regular energy audits are required at least every four years for non-SMEs, unless an ISO 50001-certified energy management system is in place.

- Audits must follow defined quality standards (e.g. EN 16247) and cover a significant share of the organisation's energy use.
- ISO 50001 is recognised as a valid alternative to audits — companies with a certified energy management system are exempt from the audit obligation.
- SMEs are not obligated to conduct energy audits, neither to implement an ISO 50001 – certified energy management system.

Binding energy saving targets

The EED also sets clear, legally binding energy saving goals at the EU level, which directly influence national energy policy and company-level obligations:

- The EU aims to reduce final energy consumption by at least 11.7% by 2030 compared to 2020 projections.
- Each Member State must deliver new annual energy savings — reaching 1.9% of final energy consumption per year by 2030.

While the directive sets common rules, each EU Member State is responsible for transposing the EED into national law. The core obligations apply EU-wide, but the specific legal requirements, deadlines, enforcement rules, and incentives may vary by country. Many governments go beyond the minimum, adding stricter measures or additional reporting and documentation duties.

ISO 50001 and certification requirements

An ISO 50001 certification requires a company to comply with specific legal requirements related to energy consumption. The international standard for energy management, ISO 50001, helps companies establish systems and processes that continuously optimise and reduce resource and energy consumption.

Energy management is an effective tool for setting an ambitious energy policy and systematically working with energy targets at all levels.

Once a company is certified according to ISO 50001, annual surveillance audits must be conducted, and recertification must take place every three years. These requirements are defined in the international standard ISO/IEC 17021-1 and further specified in ISO 50003, which specifically regulates the certification of energy management systems (EnMS).

1. Data collection and monitoring

Automated real-time data collection on energy consumption. This provides accurate and up-to-date information about your energy use and performance.

2. Analysis and reporting

The EMS analyses the collected data to identify energy-saving opportunities and inefficient processes. It can generate reports and analyses to document compliance with the ISO 50001 standard.

3. Efficiency improvements

By using the EMS, companies can implement and monitor energy efficiency improvement measures and initiatives. The EMS helps plan and manage these improvements systematically.

4. Compliance and documentation

The EMS assists in maintaining documentation and traceability of the energy management system's performance, including fulfilling ISO 50001 requirements for documentation and communication.

5. Continuous improvements

A core part of ISO 50001 is the continuous improvement of energy performance. The EMS supports your company in setting goals, measuring results, and implementing improvement activities in a structured manner.

An Energy Management System (EMS) under ISO 50001 must, beyond data monitoring, also support:

- **Energy policy and objectives** – strategic guidelines.
- **Action plans and improvement initiatives** – concrete planning and follow-up.
- **Documentation and compliance** – ensuring adherence to legislation and audits.
- **Management commitment** – involvement of top management in decision-making.

An EMS solution, combined with consulting, provides the best support for ISO 50001

To ensure that your EMS covers all workflows within energy management, the solution should include both an EMS platform and advisory support. The combination of technology and consulting makes it easier for your company to translate data into concrete energy improvements. At the same time, the ability to integrate with other systems is a crucial factor in getting the most out of your existing system landscape.

The figure below illustrates, using an example from Enity's own EMS platform, how an EMS supports the five certification areas. It also shows how many aspects rely on a combination of EMS functionality and human support and consulting.

	EMS	Support
Data collection and data validation		
Automatic data collection and measurement of energy consumption		
Monitoring and logging of energy consumption (electricity, heating, gas, water, etc.)		
Real-time and historical data analysis		
Integration with existing meters and sensors		
Energy performance analysis		
Identification of consumption patterns and deviations		
KPIs for measuring energy efficiency		
Benchmarking energy performance over time or against building usage		
Energy goals and action plans		
Set and follow up on energy goals (EnPIs) and action plans (Baseline & Targets 2025)		
Tracking improvement projects and evaluating their impact (Baseline & Targets 2025)		
Documentation of energy-related decisions (Baseline & Targets 2025)		
Continuous improvement		
Support for Plan-Do-Check-Act		
Ongoing evaluation of energy efficiency measures (add-on service)		
Customisable dashboards for management reporting		
Reporting and documentation		
Standard and custom reports for ISO 50001 audits		
Energy and CO ₂ reporting for sustainability initiatives		
Integration with ERP and BI systems for cross-functional analysis		

Plan-Do-Check-Act method

The PDCA method (Plan-Do-Check-Act) is a structured and cyclical approach to continuous improvement of energy efficiency. It is widely used in quality management, energy management (e.g., ISO 50001), and business optimisation.

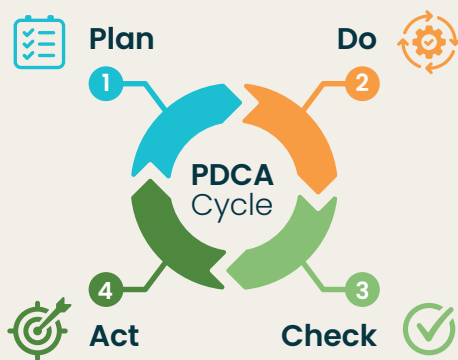
Method and benefits

The PDCA method provides a structured approach to energy management with a focus on continuous improvement. It ensures data-driven decision-making, so energy management is based on analysed facts rather than assumptions. The method is flexible and enables quick adaptation to new requirements and technologies. At the same time, it supports compliance with ISO 50001 by facilitating certification and documentation of energy improvements.

One of the key benefits is cost savings, as systematic energy management reduces energy waste and operational costs. Additionally, PDCA increases engagement by involving employees and promoting an energy-conscious culture.

In short, the method ensures a continuous improvement process that makes energy management more effective and value-creating.

PDCA-cycle in ISO 50001



1. PLAN (Plan)

- Establish the organisation's energy policy and commitments.
- Conduct an energy review to identify energy consumption and improvement opportunities.
- Define energy targets and action plans that support energy efficiency.
- Identify relevant legal requirements and standards.

2. DO (Implement)

- Implement the planned energy improvement measures.
- Provide resources, competencies, and training to employees.
- Establish operational control and management of energy-consuming processes.
- Document and record energy data.

3. CHECK (Monitor)

- Monitor and measure energy performance using KPIs.
- Perform internal audits of the EMS to assess compliance with requirements.
- Analyse data and identify deviations from targets.
- Evaluate the effectiveness of implemented energy improvements.

4. ACT (Improve)

- Take corrective actions based on analyses and audits.
- Update the energy policy, targets, and action plans as needed.
- Improve processes and workflows to strengthen energy efficiency.
- Ensure management is involved in the ongoing improvement of the EMS.

Is there an official approval of systems supporting ISO 50001?

ISO 50001 certification focuses on certifying a company's energy management system (EnMS), not the software solution (EMS) itself. There are national programs, approvals, or recognitions for software tools that support energy management, but these are not part of the ISO 50001 certification itself. Different countries may have their own standards or approval processes for software.

- **Germany** has been a leader in ISO 50001 certifications. Here, software can be certified for use in ISO 50001 processes, providing a kind of "pre-approval" for companies seeking certification. Additionally, software can be approved for the BAFA list. BAFA (Federal Office for Economic Affairs and Export Control) is a German authority that administers support programs for energy efficiency and energy management. The BAFA list includes approved software solutions and technologies that support energy efficiency, and companies can receive financial support to implement them.
- **In Denmark**, it has been decided that software solutions for ISO 50001 are not certified or approved. However, companies investing in energy efficiency can apply to the Danish Business Authority for subsidies from the business development fund.
- **In other countries**, procedures for certifying and approving software tools vary. Some countries have their own standards or approval processes for software that supports energy management, while others do not have specific requirements. It is important to consult local authorities or certification bodies for precise information on the applicable practices in each country.

In many countries, there are subsidies or tax incentives linked to the use of a certified energy management system.

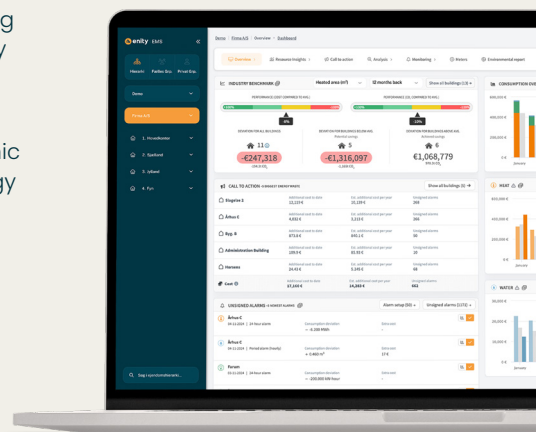
Enity EMS certified for energy management in Germany

The Enity EMS energy management solution is certified in Germany according to ISO 50001 — the internationally recognised standard for systematic energy management.

Additionally, Enity EMS is listed on the BAFA list, meaning this EMS platform is officially approved by the German authority BAFA (Federal Office for Economic Affairs and Export Control) as a tool that supports energy efficiency and energy management.

Companies using Enity EMS therefore find it easier to achieve ISO 50001 certification because BAFA has already approved the software as suitable for energy management.

The German certification and BAFA approval make Enity EMS a recognised, standards-compliant, and future-proof solution for energy management.



Coop has Denmark's largest energy management system in retail



Coop has implemented the ISO 50001 energy management standard in all Coop stores, distribution centers and office facilities, making it Denmark's largest energy management system within retail. This certification commits Coop to continuously improving its energy efficiency and reducing energy consumption.

As part of this effort, Coop has carried out several initiatives, including:

- Replacing oil and gas boilers with heat pumps.
- Replacement of 1st generation LED lights.
- Lowering the temperature to 19 degrees Celsius in warehouses, service offices, and stores.
- Installing solar power systems on stores and distribution centers.
- Implementation of systems for recycling excess heat in stores and distribution centers.

These measures have resulted in an energy reduction of 26 million kWh in 2024

- Coop's energy management system has received international recognition, and the company was awarded the "Award of Excellence in Energy Management" for its effective use of the ISO 50001 standard.
- Additionally, Coop has developed a climate action plan approved by Science-Based Targets, ensuring the plan aligns with the goals of the Paris Agreement.
- Through these initiatives, Coop demonstrates a strong commitment to sustainability and energy efficiency across its operations.



Facts about the solution

- We collect data from and monitor 700 buildings
- A total of 9,300 meters

Coop uses **Enity EMS** as a central part of their strategy for energy management and optimisation. It provides a comprehensive overview of energy and water consumption as well as CO₂ emissions across their stores, distribution centers and office facilities.

Key features of Enity EMS important for Coop

With Enity EMS, Coop can proactively manage their energy consumption, identify opportunities for energy savings, and ensure continuous improvement of their energy performance. This supports their overall goal of reducing energy use and minimising environmental impact.

It is a combination of automated data collection, tools within the Enity platform (especially key figures, regression analyses, and accurate master data), specialised Excel reports with EnPI and EnB, and our services that support Coop.

Automated data collection:

The system automatically collects data from various energy meters. This ensures that Coop has accurate and up-to-date data available for analysis and reporting.

Monitoring and analysis:

Enity EMS offers dashboards that provide a quick overview of total energy consumption. Coop can monitor consumption patterns, identify potential energy waste, and benchmark performance across different locations.

Reporting and compliance:

The system supports reporting of energy consumption, helping Coop meet the requirements of their ISO 50001 certification.

Support functions in addition to Enity EMS

The system is also accompanied by a range of support services, particularly important for ISO 50001:

- High data quality (in the form of Enity Meter or Full Service).
- Alerts in case of deviations in energy consumption (Enity Full Service).
- When deviations occur, the store is informed and a case is logged.
- Follow-up is conducted to ensure energy consumption is reduced.
- Cases are recorded directly in Coop's own Dalux system, allowing all Coop employees to track energy issues.
- Assistance in connection with ISO 50001 audits.

How Enity EMS supports ISO 50001 certification

Our EMS delivers a combination of automated data collection, analytical tools such as key performance indicators, regression analyses, accurate master data, specialised Excel reports with EnPI and EnB, and not least, the energy consultants behind our service concepts.

- Automated data collection and real-time monitoring of energy consumption data.
- Analysis and reporting of collected data.
- Efficiency improvements—by implementing and monitoring targets for improvements and initiatives.
- Compliance and documentation.
- Continuous improvement that enables you to set goals, measure results, and implement improvement activities (the PDCA cycle).
- Our energy consultants are a key factor in supporting tasks such as data validation, action plans, audits, and more.

Enity functions and services that support your ISO 50001 certification

Resource Insights

Overview of energy and resource consumption. Identify deviations and prioritise your efforts.

Analysis tools

Key figure and regression analysis, accurate master data, custom reports in Excel with EnPI and EnB.

Energy models

EnPI's such as baseload, base temperatures, heating/cooling degree days, etc.

Logs

Notifies relevant employees when deviations are registered.

Data collection & monitoring

Automated data collection and monitoring of energy consumption.

Data validation

Customers are informed of meter errors and registered deviations.

Reporting

Customised and automated reporting.

Tracking

Tracking of efficiency improvements.

New in 2027

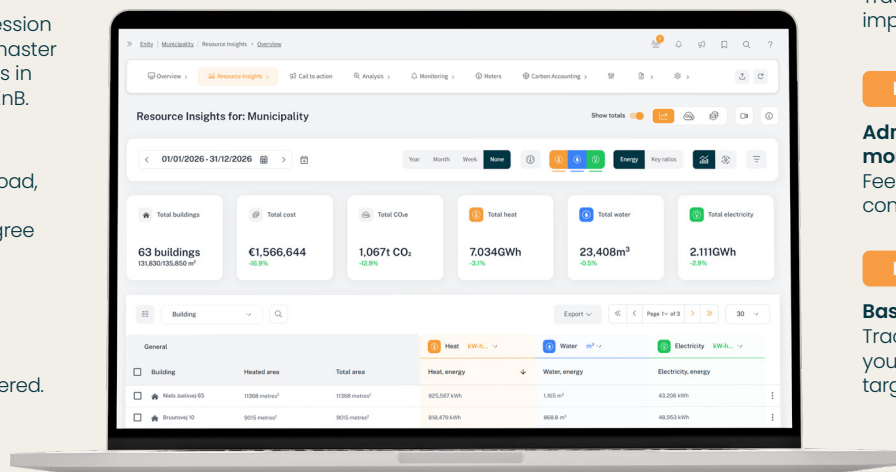
Administration & monitoring of action plans

Feedback loop for continuous improvement.

New in 2027

Baseline & targets

Track progress from your baseline to your targets targets.



Get started with digital energy management

If you need more inspiration on how to implement an EMS in your organisation, you can get support and advice from our experts.

ISO 50001 certification doesn't have to be a complex process. With Enity EMS, your company gets the necessary tools to systematically manage, monitor, and improve energy consumption. Contact us to learn more about how we can help you on your journey towards a greener and more efficient future.

Contact us for a demonstration of how Enity's EMS platform and consulting team can support you in your work with energy management, certification requirements, and legislation.

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