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ISO 50001

Everything you need to know

The Complete Guide about ISO 50001
for companies that want to save money on energy.

Contents

A complete guide to ISO 50001 for companies

The publication of ISO 50001 made it possible for companies who go ahead and obtain certified status to achieve systematic savings in energy usage, and consequently in costs.

But the process of implementing ISO 50001 is not straightforward, and this has caused a fair few headaches both for energy sector professionals and for company managers.

If you are in the midst of this process, or considering whether or not it is worthwhile to even start, Spacewell Energy (Dexma) has published this Complete Guide to ISO 50001 and how to implement it in your business.

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What is ISO 50001 and why is it Important?

ISO 50001 is a specific standard for energy management created by the International Organisation for Standardisation (ISO), an independent and non-governmental organisation. All of the standards created by the ISO are voluntary, and therefore so is ISO 50001.

The ISO 50001 standard was first published on the 11th June 2011 under the title "Energy Management Systems - requirements with guidance for use", with a second edition released in 2018.

ISO 50001 establishes the process to define, implement and maintain an energy policy, a process that should be supported by the senior management of the organisation. **It seeks a commitment from the core of the business** - that is to say, from those who make the key decisions - to systematic energy conservation.

The ISO 50001 is important for organisations to adopt certified energy management processes, define clear goals for energy savings and align with current energy laws and requirements. This standard has considerable benefits for organisations who consume energy and need to control this significant operating cost. The advantage of ISO 50001 is that it is designed so that any company can use it, regardless of their activity, size or geographical location.

ISO 50001 in Numbers

Thanks to the significant advantages it can offer to companies, in 2022 over 27,000 organisations had achieved ISO 50001 certification, covering over 53,000 sites.

Until the 2018 revision, the majority of the certified companies were concentrated in Europe, with Germany being the country with the most ISO 50001 certifications worldwide. But it has now been overtaken by China, with roughly 25% of all certifications.

Germany is still the country with most ISO 50001 certifications in Europe followed by Spain, who has seen a huge increase of certifications, Italy, France and the United Kingdom.

What is the purpose of ISO 50001?

You may well be asking yourself this question, given that this is a voluntary implementation. It is important not to confuse concepts when talking about ISO 50001.

It is not a 'law', it is a methodology. It proposes a process that will guide you when implementing an efficient system with which to manage your energy, generate savings, and consolidate those savings.

The most basic and essential purpose of the regulation is that it makes it easier for public or private organisations to implement an energy management system.

The key 5 **Benefits of achieving ISO 50001 Certification** from professionals who have already implemented it:

1 **Cost Savings**

- Derived from a reduction in energy consumption.
- Derived from savings in production costs.

2 **Reduction in Energy Consumption**

In addition to this reduction, it has an impact on the reduction of CO_2 emissions and other harmful substances that contribute to climate change.

3 **Compliance with legislation**

We've said ISO is not law, but many countries are developing more specific laws regarding energy management for organisations, in line with the ISO 50001 requirements. Or even requiring ISO 50001 certification altogether. This means that complying with ISO 50001 will help you be prepare for existing or new laws. In other cases, the benefit of implementation is that it will score highly in bids or public procurement.

4 **Standing out against competitors**

5 **Enhancement of the company image**

Before clients, regulators, suppliers and shareholders.

9 main changes in the 2018 revision of ISO 50001

The ISO 50001 standard had a 2nd edition published in 2018 to adapt to new technologies, regulatory measures and current circumstances. Above all, climate change and increased energy costs were the main drivers in the ISO's decision to review the standard. The result was **ISO 50001:2018**.

The main changes incorporated into the new version of the ISO 50001 standard were the result of adopting the **structural improvements** that are commonly found in all the ISO standards. This is what the organisation refers to as the "ISO High-Level Structure" or HLS.

The main updates of the new ISO 50001:2018 are set out below:

1 Compatibility with other management ISO's.

Such as ISO 14001 and ISO 9001 and improved alignment with other management certifications. If your company already has other ISOs or is in the process of obtaining them you can take advantage of the changes to also obtain the ISO 50001 certification.

2 Extended to further sectors.

It can be extended to the three major energy sectors:
industrial, tertiary and transport.

3 Improved energy planning alignment.

The aim is for your organisation to be able to prepare more strategic and tactical plans.

4 Increased importance of Senior Management.

Leadership is to have clearly defined roles, responsibilities and authorities within the organisation.

5 Inclusion of external communications.

It extends the requirements related to internal communication while also including communication with the outside.

6 New requirement: performing an assessment of the risks.

That may affect the correct implementation of the energy management system. The objective is to anticipate potential scenarios and deal with them before they materialize.

7 Clarifications about energy efficiency and energy management systems.

With particular emphasis on concepts definition. New requirements have been included for greater precision in the evaluation of energy efficiency from the consumer baseline.

8 Data acquisition and standardization have been clarified.

Mainly regarding data acquisition and the requirements. In other words, the plan must indicate the frequency with which the consumption data is obtained and stored, relevant variables, operational characteristics, static factors, etc.

9 Increased number of metrics.

To demonstrate improvement in energy efficiency.

By now, you are most probably looking at the right ISO guidelines and not the 2011. But it's relevant to understand how the standard has evolved and the key areas to consider. If you already have the ISO 50001 Certification and have any doubts, we recommend you get in touch with the firm you used to obtain it and they will help you adapt.

If you don't yet have the ISO 50001 certification and don't know where to look, perhaps one of our partners can help you. **Get in touch** with us and we'll be happy to help you or put you in contact with a partner in your area. Our 250+ partners include a wide range of companies that specialise in energy consulting and provide ISO certification services.

How to implement ISO 50001?

Preparing your company for ISO 50001

ISO 50001 will impact all the processes of your company, and so the first thing that you must do is prepare for it. There are three key elements that you should have ready to get started:

Having a dedicated team

Documentation of the process

The right technology

Experienced and dedicated person (or persons) to lead the process

It is advisable for the company to have an Environmental Manager or Energy Manager, who, whilst s/he may have other responsibilities, will lead the project internally. This person must be a capable decision maker and carry authority within the organisation.

In addition, you may find it necessary to appoint a technical auditor. This figure is external to the company and is responsible for drafting the energy audit. The audit is not mandatory, but it is good practice to perform one before implementing the Energy Management System (EMS).

Finally, the technological knowledge of the internal energy management team must be taken into account, alongside building maintenance or environment.
If the level of knowledge or experience is low, or if workload restraints are such that the installation of the EMS cannot be undertaken internally, you will need an energy consultant or energy services company (ESCO). At Spacewell Energy we work with hundreds of such businesses worldwide and can help you in the process. **Contact us here if you need assistance.** The task of this person is to install your energy analysis technology and adjust and adapt it to the ISO 50001 standard.

Documenting the process

In order to comply with the ISO 50001 standard, it is necessary to document the following steps of the implementation process, including:

→ **The energy policy of the business**

→ **The energy plan (energy review, baseline energy consumption, energy performance indicators, programme objectives)**

→ **The results of monitoring and measurement - you should document the processes of testing and measurement, even if they are internal**

→ **The evaluation of legal compliance**

→ **The results of the internal audit and review carried out by the management of the organisation**

In addition, your organisation may choose to document any other requirements considered appropriate.

ISO 50001 advises companies to have at their disposal, as a minimum, the monthly consumption of the last 12 months from all energy sources that are representative of the global energy consumption within the organisation.

With this information at hand, you will be ready to begin the implementation process. And we are not simply talking about electricity. The implementation of ISO 50001 includes gas consumption, diesel,... etc. Water however, is beyond the scope of ISO 50001.

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The right technology

Implementing ISO 50001 will require you to manage your energy data in real time. Only in this way will you be able to correctly measure your installation consumption, monitor your progress and as such, guarantee the cycle of continuous improvement that is offered by ISO 50001.

Two fundamental technologies are involved when it comes to achieving this:

**Energy efficiency hardware**   **Software**

The hardware, or devices for measurement, includes all meters, concentrators, gauges, sensors, etc. that are installed in switchboards, gas meters or simply in the building itself to take measurements of energy consumption. There are also specific ones for monitoring other conditions that affect energy use such as humidity, temperature, etc.

Software is the tool that collects all of this data and presents it to you so that you can analyse and understand it and thus, make decisions. For the ISO 50001 standard, it is taken as given that your software should facilitate the documentation process. How? Thanks to reports and dashboards with clear information and easy to digest data. Of course, it is also very much recommended for your software to incorporate measurement and verification tools (M&V). This function helps demonstrate the savings generated by the energy plan. You can learn more about the **M&V solution in this webinar recording**.
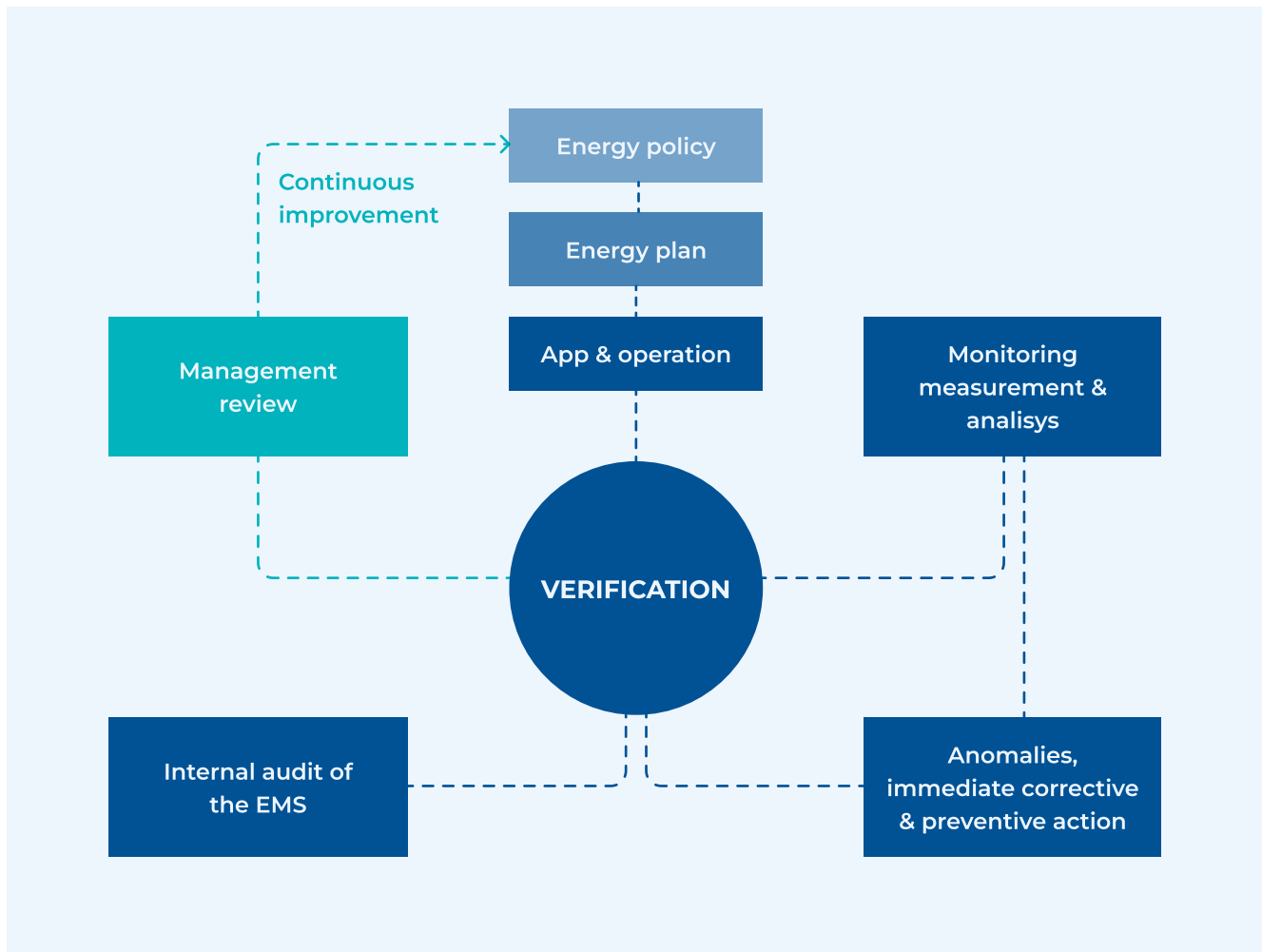
After mentioning the technology, let's go deeper into it in the following section.

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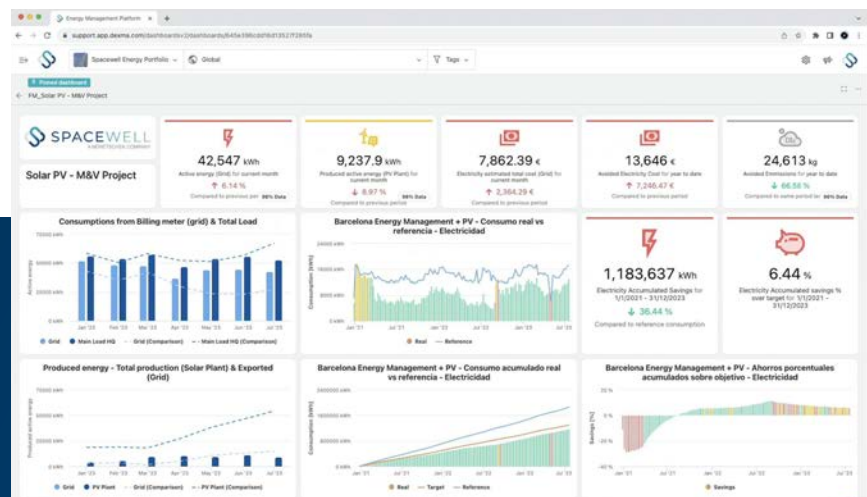
How Technology fits into the Energy Management process

ISO 50001 outlines the steps within the overall process for efficient energy management, proposing a model for an Energy Management System.

When implemented, you will see that ISO 50001 places great emphasis on highlighting what is a process and what is ongoing.

Therefore, it not only deals with 'actions' to carry out, such as speedy reforms, but rather with entire processes that will have to be put in place, which your organization may not already have.

In order to access the complete requirements of the technology, the ISO has made available the **complete text of the standard** (which needs to be purchased through the organizations website).

6 Steps for Success

1 **Involve the whole team:**

ISO 50001 insists that the company must be convinced of, committed to, and supportive of the energy management plan. But it is also important to involve all staff that may have an impact upon, or be impacted by, the energy plan. The channels of communication must be kept open throughout the entire process.

2 **Carry out a strong initial analysis:**

It is advisable to carry out an initial audit that draws on previous internal work: it is important to identify how the organisation works in relation to energy.

3 **Comply with legislation:**

As you begin to implement an Energy Management System it is important to check if your organisation is affected by any environmental or energy-related legislation, or if your home country or community have legislated in detail which certifications are acceptable demonstrations of compliance. For information, we recommend that you visit the **OFGEM authority web page** (for UK) or the **U.S. Energy Information Administration web page.** Both are valuable official sources of information on legislation and energy regulation.

4 **Be sure of having sufficient means:**

There is little point in beginning the implementation of ISO 50001 if professionals cannot be provided with the appropriate means for managing a system and maintaining its performance.

5 **Recruit and motivate the right talent:**

Your organisation must be able to rely on specific figureheads who understand the keys to energy efficiency. If you choose to work with external consultants, choose those who specialise in energy management.

6 **Review the system and the processes involved:**

This is an indispensable step in order to obtain ISO 50001 certification. External reviews will follow, but it is also essential to put in place internal quality control and monitoring processes.

Choosing and Deploying the Energy Management Technology

There are hundreds of energy monitoring technologies on the market, but far fewer that offer the capacity to analyse consumption and to control the full cycle of the Energy Management System as the ISO 50001 model requires.

Depending on which one you choose, the installation could be smooth and simple, or it could be a string of setbacks.

At **Spacewell Energy** we provide you with a platform on the cloud where you can monitor your energy data in real-time and centralise your energy management to ensure that technology is not an obstacle.

Monitoring technology - the hardware - may be installed during the first week of work in the building if you have the relevant permissions from facility and building managers. Bigger projects will perhaps require a few more days.

The installation of the software, in the case of Spacewell Energy, takes no time at all. There is no need to install anything in your computers. We simply create your account and you can begin configuring the meters and receiving instant data from different sources. All centralised in our platform to make it easier for you.

Thus, the most common approach is to install the meters and immediately access the account, configure it and check that data is being received as it should. This can usually be done in a period of 48-72 hours.

What if you already have measuring equipment?

Then it can be even faster to get started. You need to select the software and proceed with deployment or installation. The Spacewell Energy platform, for example, is neutral in terms of hardware. This means that it can receive data from any source thanks to the open API and multiple integrations, making it easier for you to centralise your energy data in one place. Therefore you can feel safe in the knowledge that your measurements will be integrated and you will receive data with the same speed.

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And if you already have a tool for viewing data, but want to change it?

Data migration is no problem either, thanks to the flexibility of the Spacewell Energy solution. We have migrated data for large companies in less than 48 hours. **See our video demo here** and contact us if you want to know more about our EMS.

# How long does it take to implement the Energy Management Process?

The time frame depends on the characteristics of each organisation. In general, it can vary between 3 months and 1 year, in the case of larger or more complex companies. **This includes the time to prepare all the internal steps covered up to now in this guide.** Actually starting to use the software after all this is completed should be very quick (days or less), as noted above.

When estimating your own situation to get started, think about the variables that can affect the timeframe of implementation, including:

→ **The type of organisation**

→ **The current state of your energy plan (if you have a monitoring system or not, whether or not you have carried out an audit in the past, even if it was only a partial audit…)**

→ **The complexity of your installations**

→ **The complexity of your production process (especially important in the industrial sector)**

→ **The resources that you are going to dedicate to implementation - having one sole implementation manager is not the same as having a team of five people**

How much does the EMS technology cost?

According to our experience, the most sensible approach is to invest according to the **10% rule**, which means investing about the equivalent of one average monthly energy bill at the start of the project. That is to say, if your installation consumes an average of €30.000 a month, this is your estimate for the cost of energy management.
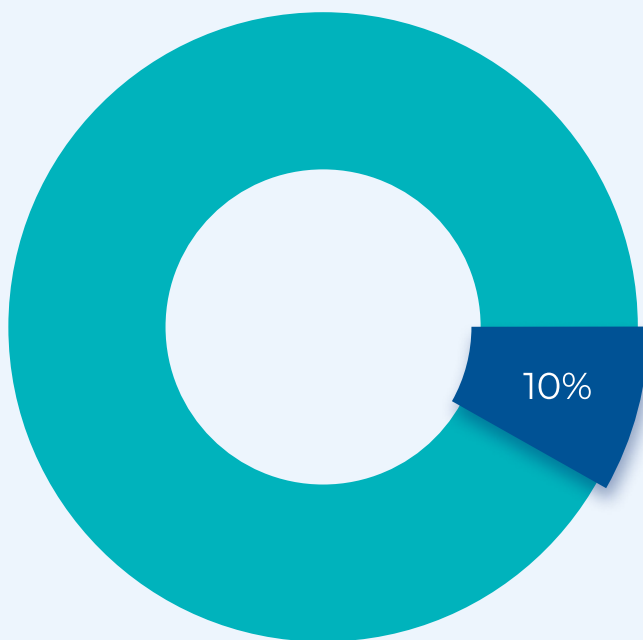
10% of annual energy spend

How much does your business spend on energy every year?   Take 10% of that amount, and you've got your recommended energy efficiency budget.

10%

● **Current budget**

● **Recommended budget**

10% of your annual energy cost should be re-invested in energy effiiciency measures.

Why? If we paint a 'pessimistic' picture in which you only save 8.5% a year, you will already have a 1 year ROI (the month that you save for the whole year is approximately 8.55%).

Normally, the cost is split into 60% hardware and installation, 30% external services and 10% analysis software.

However … it is pretty nice to think that from the second year onwards, you will only have to keep paying for the external services and the software, as a result of which the cost is practically marginal when compared to the savings achieved.
Thus, **the technology, perhaps surprisingly, is the least significant of the costs involved in implementing ISO 50001.** More significant costs will be the services for the initial audit, if one is carried out (it is advisable) and those of the certification body (which we will talk about at the end of this guide).

Choosing your Energy Management System

Now that you've seen the role of technology, let's recap. Here are 5 characteristics to look for when deciding on the right technology for your organisation:

Straightforward installation:

How long does it take to deploy? Is there a complex installation? Being able to rely on meters that can be configured in less than 5 minutes, and an online platform, will help you analyse your energy consumption more quickly.

Scalable functionality:

Ideally, choose a technology that covers your current basic needs but also offers more advanced analytics tools, including benchmarking or anomaly detection. In this way, you can fulfil the commitment to continuous progress promoted by ISO 50001.

Easy to use and highly visual:

Your day-to-day affairs are complicated enough without the additional strain of having to learn new technology platforms. You probably want to see the key information quickly. We recommend that you see your platform for yourself before buying it. Is it user-friendly? You should ensure that the technology is easy to learn and clear in regards to the user. It may look obvious, but technology needs to help you with your job, not make it more complicated. If you're at this stage, you can request a demo from your providers. **Here's Spacewell Energy's demo** to give you an initial overview.

Possibilities for collaboration:

ISO 50001 promotes the implication of the entire company, and especially the management, in the energy plan. Technology should help you achieve this, for example by offering the option of creating different views and dashboards with real-time data for the different stakeholders across the company. Or even outside of it.

ISO 50001 customizable reports:

Before taking the plunge, ask if you will be able to create personalised reports that are adaptable to your business and adaptable to ISO 50001. This will help you with the documentation process and, above all, in subsequent audits and when renewing the certificate.

A practical example of ISO 50001

In this section, we want to present a practical example, based on the real Energy Management System ISO 50001 certification process of one of our clients.

Let's provide with some context:

→ Hotel building

→ Built 22 years ago

→ With 408 rooms

→ Situated on the Spanish coastline, in an area with a warm climate

→ Its facade is brick and windows, with a terrace for each room

→ The management is concerned about air conditioning, hot water and lighting costs

→ They have a maintenance manager with some energy knowledge, but costs are the most concerning issue for the financial department

Due to their concerns over energy costs, the hotel was preparing an energy plan but advancing slowly. Since the publication of the Spanish Royal Decree 56/2016, the hotel group saw themselves obligated to fulfil this aim.

The hotel's headquarters opted to fulfil this requirement through the implementation of an Energy Management System with ISO 50001 Certification in every hotel.

But our particular hotel had no kind of preparation in place for this. For this reason, they decided to carry out a preliminary energy audit. The result provided a series of recommendations for energy retrofits:

→ **Improve the insulation of walls and roofs**

→ **Replacement of windows with thermal break after issues detected**

→ **Boilers replacement by new and more efficient models: condensation, low temperature, biomass...**

→ **Thermic or photovoltaic solar energy to support the system**

→ **Lighting improvements such as efficient LED system and automatic lighting to replace existing system and reduce consumption**

→ **Incorporation of free cooling and/or inverter air conditioning systems**

There was a preliminary step to achieving the reforms. Did the hotel have energy analysis and management technology? No, in this instance the hotel did not have that technology available.

It is at this point when it's even more interesting to install meters (if you do not have them already) and begin receiving the first set of data on an energy analysis platform such as Spacewell Energy.

Why is it important to install meters and start monitoring data at this stage?

To fulfil the basic requirements of the ISO 50001:

- Recording and certifying, with figures, the impact of the EMS
- Calculating the baseline energy consumption
- Establishing a cyclical process for continued improvement in energy usage across your organisation.

Without technology that can monitor, analyse and optimise energy correctly, it is difficult to fulfil ISO 50001 standards. And that's why it's important to start with energy monitoring at this stage.

Going back to our hotel, they were not able to measure their energy consumption. Hence, it was not possible to determine how to reduce it, to highlight problems or inefficiencies, to identify areas where the hotel's energy policy was not being applied, etc. Therefore, in this case the hotel decided to improve their measurement system through the installation of new meters, and connecting them with a datalogger in order to send data to the internet and analyse it with the Spacewell Energy EMS.

Then, the energy retrofits were undertaken. With the measurements and subsequent analysis offered by the EMS, the hotel management and the Head of Environmental Maintenance had the necessary data and knowledge to make informed decisions.

The energy policy of the hotel

The reach of the policy, the reforms, etc.

The desired results

They proceeded with reforms, and this is the ideal moment to start the process of obtaining Energy Management System certification

And of course, throughout the whole process, the hotel was documenting the work, in order to fulfil the requirements of ISO 50001…

In the next section you can see the steps and what exactly this process consists of. Keep reading!

"Getting Regulation ISO50001 certification is a voluntary process, of course, but I would recommend any manager to take a step forward and implement it. It's a tool that allows us to systematically achieve and control the level of energy efficiency that we have established."

Isabel Balsach

Project & Energy Manager at Leading Pharma Company

ISO 50001 Certification - The Process

Who evaluates whether or not I qualify for verification for my energy management system? When certifying your work, you will have to work with an accredited certification body. Some the most well-known entities are:

TÜVRheinland®
Genau. Richtig.

bsi.

DNV

How will they evaluate me?

Normally, the accredited certification bodies carry out two phases of evaluation (although the methodologies of these can change from one body to another, of course).

(1) The first phase is an initial audit, in which the accreditation body will check:

- That the implementation of the EMS has been correctly documented
- That the scope of the system and its requirements (if relevant) have been correctly expressed and defined by the organisation
- That the internal reviews and checks, orientated to continuous improvement, have been planned for and are being realised
- Given the insistence of ISO 50001 that the energy management plan is an active strategy, understood and supported by the management of the company, the auditors can check the degree of internal understanding of the EMS.

(2) The second phase consists of groundwork

- The auditors will visit the place in which the Energy Management System has been implemented
- They will check that it is functioning correctly
- After, they will also check if it complies with ISO 50001 requirements.

With their findings, there are two results. Either they will issue your certificate (congrats!) or report of non-compliance, with highlighted areas for improvement. In this last case, your organisation must present an action plan for the resolution of these problem areas.

How much will it cost?

The cost of the certificate depends on the function of the organisation.

Alex Ciurana of PGI Group, a partner company of Spacewell Energy that already implemented ISO 50001 approved Energy Management Systems, commented that if the auditing process includes more than one building, the cost increases in proportion with the number of buildings.

"The cost varies between €2.500 to €4,000 per year. For each visit an auditor will usually charge around €600, and they can carry out a couple of visits a day. The implementation of an ISO 50001-approved Energy Management System allows you to develop and justify businesses' actions in energy efficiency."

Alex Ciurana

Energy and Sustainability Director, PGI Group

PGI Engineering & Consulting

How much time will it take for my certification to be issued?

The timeframe for the issuing of the certification depends on the accreditation body. However, there are some recommended timeframes that may not be exceeded. For example, no more than three months should pass between the execution of` phases 1 and 2.

How long is my ISO 50001 certification valid for?

Three years. After three years, you will have to renew with the accreditation body you have chosen.

What happens during this time? It is usual to expect annual audits from the same body from which you have received your accreditation. These happen in order to monitor activity and guarantee the process of continued improvement is being carried out correctly.

How can I evaluate compliance with ISO 50001?

The accreditation bodies have the last word on whether or not a company has complied with the proposed methodology for ISO 50001.

After the first cycle, periodic checks will be made to ensure that ISO 50001 requirements are consistently being met.

Take care here to:

- Correctly maintain and update your records
- Review the EMS to ensure that everything is functioning as it should
- Review changes in legislation or requirements that your organisation has promised to fulfil in its energy plan

Failure to comply with ISO 50001 requirements can cause the loss of your certification, at least for the period of time that passes between the negative report from the accreditation body and the implementation of the necessary measures to resolve the highlighted problems.

No fine or penalty will be imposed, since this is voluntary. Remember that at the start of this guide, we commented upon the fact that ISO 50001 is not a law.

However, as we also mentioned in this guide, some businesses have begun to take an interest in the regulation because of legislative changes that affect them and oblige them to take action to improve their energy efficiency.

The UK Government, for example, implemented **ESOS (the Energy Savings Opportunity Scheme)** already in 2014. This law is mandatory for any UK company that either employs 250 or more people, or has an annual turnover in excess of £44 million, and an annual balance sheet total in excess of £38 million. In addition, it also applies to overseas companies established in the UK with more than 250 workers in the country.

Companies affected must have an implemented EMS certified by ISO 50001 or pass an energy assessment. You can see here the importance of this ISO standard for your business.

Ready to start saving energy today? Do you want to prepare for ISO 50001 Certification?

Hopefully this guide has provided you with ideas and now you see the benefits of obtaining the certification more clearly.

Video presentation

Visit our video demo to see what the Spacewell Energy Platform can do for your organisation.

Get in touch

Or **contact us directly** to discuss your energy management needs and your next steps towards energy efficiency.

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