

How To Improve The Effectiveness of Energy Management System Certification

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Abstract. Using energy efficiently helps organizations save money as well as helping to conserve resources and tackle climate change. ISO 50001 supports organizations in all sectors to use energy more efficiently through the development of an energy management system. After the conducted analysis, energy management system certification effectiveness not draw much attention and the paper tries to fill the gap. Energy management system certification effectiveness should be improved from the enterprise, certification body and supervision department.

1. Introduction

Using energy efficiently helps organizations save money as well as helping to conserve resources and tackle climate change. ISO 50001 supports organizations in all sectors to use energy more efficiently, through the development of an energy management system (EnMS). Published in 2011. In June 2016, the International Organization for Standardization (ISO) announced that ISO 50001 for EnMS would be the latest standard to enter the ISO revision process. ISO 50001:2018 specifies requirements for establishing, implementing, maintaining and improving an EnMS. The intended outcome is to enable an organization to follow a systematic approach in achieving continual improvement of energy performance and the EnMS. The document is applicable to any organization regardless of its type, size, complexity, geographical location, organizational culture or the products and services it provides. Also is applicable to activities affecting energy performance that are managed and controlled by the organization and applicable irrespective of the quantity, use, or types of energy consumed. The document demonstration of continual energy performance improvement, but does not define levels of energy performance improvement to be achieved.

2. Literature Review

ISO 50001 has become increasingly important since its release six years ago. A total of 20,216 certificates for ISO 50001 were issued by the end of 2016, according to ISO. Its global survey shows that ISO 50001 certifications increased by 77% and 69% during 2015 and 2016 respectively. The ISO 50001 system on energy management has become one of the fastest-growing ISO management standards which was shown in table 1.



Table 1. Number of ISO50001 certificates in the world

Year	Number of certificates
2011	459
2012	2236
2013	4826
2014	6765
2015	11985
2016	20216
2017	22870

ISO 50001 is frequently implemented alongside the existing ISO14001 and ISO 9001 which are based on similar principles (Ates and Durakbasa 2012; Karcher and Jochem 2015). Castka, Pavel et al. (2015) research the choice of certification body by firms. Liu R et al. (2015) apply the fuzzy SERVQUAL method to measure the service quality of Inspection and Certification body by the of example of China Inspection and Certification Company. Zuo Z&Tang D. (2017) discuss the effective of certification on firms' performance. Antunes et al. (2014) propose an Energy Management Maturity Model to guide enterprises in the implementation of ISO 50001. The paper illustrates the integration of the norm through a five-level process, with specific activities applicable to every level. The paper have also investigated common challenges related to these activities, so that managers could attempt avoiding them. The recent paper of Jovanovic and Filipovic (2016) suggests a different maturity model and authors claim to have tested suggested levels within certified and non-certified organizations. Laskurain et al. (2015) pointed out that all the more important that ISO 50001 does not even emphasize the use of renewable energy, which would to some degree justify the necessity of energy standard. The case existed such as the leaders just want to get a certificate and enterprises do not operate according to ISO50001 principles, the auditors just want to finish the job and the supervision department does not supervise fully and so on. All of these affect the effectiveness of energy management system certification. EnMS certification effectiveness should be improved from the following aspects.

3. The strategy to improve energy management system certification effectiveness

3.1. EnMS improvement from the aspect of enterprise

Firstly, uncertainty is the source of risks, and there is certainty in the uncertainty. Enterprises should find and grasp the implicit certainty from the uncertainty; consider various laws and regulations, technology, market, society, economy and other external environmental factors from international, national, district and local levels; at the same time, they should also pay attention to the internal environmental factors such as the values, culture, knowledge and performance of the enterprise. In addition, they should also consider the relevant aspects of the company's EnMS, apply risk thinking to the planning and implementation of EnMS. This helps to determine the range and extent of documented information, and it is the basic, fundamental, and overall work for planning, designing, command and control. Secondly, the energy policy is the general purpose and direction for the companies, it was officially released by the top management to determine the expected effect and help the company to utilize its resources and to achieve its desired results. It is the driving force for implementing and improving the EnMS and providing a framework for the objectives. Energy objectives are the judgement basis for evaluating the effectiveness of EnMS. The energy policy and energy objectives are not only the code of conduct for the all employees, but also the fundamental criterion or basis for evaluating the effectiveness of the EnMS established. It is also one of the most important contents in the planning of the enterprise EnMS. Thirdly, the resources needed for the implement and the continuous improvement are measured throughout management reviews, product requirements reviews, unqualified or potentially unqualified causes investigations. The significance of

the staff energy awareness and their participation lies in saving supervision costs and releasing their personal potential. These are necessary success factors for EnMS certification. Staff at all levels are the foundation of the organization, and their full potential can only be released once they are fully involved, so that their talents will bring the greatest benefits to the organization. Without the active participation of the staff, the EnMS is just a hollow system with a formal shell. Fourthly, the company should operate according to exited documented information and continuously perfect the documented information. Fifthly, the internal audit is to confirm the compliance and effectiveness of the EnMS of the companies, and take corrective measures on the problems found to eliminate the nonconformity and the cause of it. It is also an important means of self-improvement and self-perfection. Internal auditors should be objective and fair. To determine the suitability, adequacy and effectiveness of the EnMS, managers need to conduct review on the management system according to the planned time intervals. The management review is also a value-added process. The input of the management review includes customer feedback, audit results, process performance and product conformity, follow-up measures of previous management review, suggestions for improvement, etc. The output of management review includes the improvement of the effectiveness of the EnMS and its process, human resources monitoring and the supplement measurement resources. If the momentum of energy efficiency outcomes has been established, it is very important to keep it going. The commitment to continual improvement needs to be maintained to be successful. A committed leader to drive the process and a motivated team to carry it out provides the best opportunity for a long-term program that achieves desired results.

3.2. EnMS improvement from the aspect of certification body

The top management of the ISO50001 certification body should make a commitment to the fairness of the certification activities of the management system, manage the conflicts of interest that exist or may exist, and ensure the objectivity of the certification activities. Whether the risks associated with conflicts of interest arising from certification activities arise within the certification body or other individuals or institutions, the certification body shall continuously identify, analyze, assess, dispose of and monitor these risks. Secondly, EnMS certification body should focus on building the brand. The brand is the embodiment of the culture and core value of certification body, which can bring the differentiation competitive advantage and it's the precious intangible asset. Developing brand strategy is the necessary requirement of the mature and development of the modern certification industry. Certification body need to accelerate the use of the Internet, cloud computing and big data, and provide more convenient, timely and thoughtful service to customers. The EnMS certification body is a typical knowledge-intensive service, which is the main source of information and knowledge, and provides intermediary services for clients through the use of professional knowledge. Unlike the traditional manufacturing and service industries which need large funds, equipment and other tangible assets, knowledge, intelligence, research and development these intangible assets investment mainly play a decisive role in the EnMS certification body., EnMS certification body should establish the auditors' evaluation standard; evaluation standard is not that people have much knowledge but create much new and useful knowledge for enterprise communications, encourage staffs and others to share their knowledge, thus making knowledge play the maximum value. EnMS certification body should build adaptive service culture. According to the strategic framework of service triangle, EnMS certification body Enterprises and EnMS certification body staff three key groups provide services together. Internal marketing is crucial, and a lot of evidences show that it's hard to achieve customer' satisfaction if staff feel unhappy during working. Enterprises should create a relaxed, open and free communication service culture, provide staffs with creative thinking environment and encourage staff to maximize their own value. It is necessary to establish introduction mechanism of high-level talent and intelligence resources, rely on the social resources and power. Finally, the auditors should focus on procedure-based auditing. Procedure-based auditing and process-based auditing reflect two kinds of auditing ideas, the former is to complete the task in a rule-based manner, doing what is told to do. The latter is based on the process and its performance indicators determined by the audited enterprises,

with the performance of the enterprises as the main clue, judging the conformity of process activities and standards from the overall perspective of the EnMS. The audit of process method is helpful to find out whether the EnMS of the enterprise conforms to the actual operation or not. It has the characteristics of process orientation, result orientation and continuous improvement of EnMS. Process-based auditing can also focus on the systematic of energy objectives and their relationship with process systematic, and pay more attention to the interface between processes, thus breaking the boundaries between functional units and departments, facilitating the discovery of inconsistencies between system and subsystem objectives, and helping enterprises to identify non-value-added processes and find problems existing in enterprises. At the same time, auditors ask questions around process-related activities rather than according to standard terms.

3.3. EnMS improvement from the aspect of supervision department

Firstly, the supervision department shall strengthen intermediate and post supervisions and establish a powerful punishment mechanism. The overseas certification bodies have existed for hundreds of years, they maintain the survival and development mainly by credit system, and they are recognized by such interested parties as consumer. In our country, softening of system implementation is the source of some problems, so it needs to establish an enforcement team with perfect business knowledge to give supervision, promote the integrated construction of regional supervision continuously, accelerate propulsion of the integration of the national law enforcement supervision connecting the national and local two-level inspections. Further establish and perfect the national, provincial, municipal and prefectural four-level law enforcement supervision mechanism. Secondly, the supervision department shall establish compensation fund which is similar to legal reserve of bank and shall be allocated by supervision department uniformly to realize use of funds as ear-marked and transparency of such information as compensation process, a higher proportion of amount can be specified for a third party certification body with adverse records, and supervision department can use compensation fund in compensation as to the major quality issues. The supervision department shall also try to learn from the independent supervision system outside of such industries as US certified public accountant, and overcome the disadvantages of insufficient transparency of industry association supervision and the low government supervision efficiency. Thirdly, the supervision department shall fully exert supervision function of such items as broadcast, TV, newspapers and new media to the certification market, introduce hearing system, encourage the public to participate in the adjustment and reform of the certification system, and strengthen transparency of the work; the supervision department shall establish report fund to mobilize enthusiasm of the people in reporting illegal and undisciplined behaviors of inspectors and implement the strict secrecy system as to the reporters, and shall perfect appeal and complaint handling system and program and handle complaints of the mass timely.

4. Conclusion

The paper analyzed the strategy to improve the effectiveness of EnMS certification from the aspects of the enterprise, the certification body and the supervision department. Further the strategy can be analyzed from the angles of advisory body and the implementation of ISO50001:2018 certification. Also, the impact of ISO50001:2018 certification on business performance can be analyzed. At the same time, systematic causality diagram, system flow diagram and empirical analysis on the impact of certification body on the effectiveness of EnMS certification from the perspective of system dynamics can be analyzed.

References

- [1] Antunes, Pedro, P. Carreira, and M. M. D. Silva. "Towards an energy management maturity model." *Energy Policy* 73.10 (2014): 803-814.
- [2] Ates, Seyithan Ahmet, and N. M. Durakbasa. "Evaluation of corporate energy management practices of energy intensive industries in Turkey." *Energy* 45.1 (2012):81-91.
- [3] Castka, Pavel, et al. "Understanding firms' selection of their ISO 9000 third-party

- certifiers." *International Journal of Production Economics* 162 (2015):125-133.
- [4] Jovanović, Bojana, and J. Filipović. "ISO 50001 standard-based energy management maturity model – proposal and validation in industry." *Journal of Cleaner Production* 112 (2016):2744-2755.
- [5] Karcher, Phillip, and R. Jochem. "Success factors and organizational approaches for the implementation of energy management systems according to ISO 50001." *Tqm Journal* 27.4 (2015):361-381.
- [6] Liu, Ru, et al. "Applying the fuzzy SERVQUAL method to measure the service quality in certification & inspection industry." *Applied Soft Computing Journal* 26 (2015):508-512.
- [7] Sun J., et al." Research on the Effectiveness Improvement Strategy of Quality Management System of Chemical Enterprises[J]". *Chemical Engineering Transactions*, 62 (2017): 1603-1608.
- [8] Zuo, Z.,and Tang D."Research on the impact of ISO9001 certification effectiveness on organizational performance in China." *Boletin Tecnico/technical Bulletin* 55.4 (2017):644-655.