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Energy Management Model for Sustainable Development in Hotels within WB6

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Abstract: The aim of this paper is to propose a model for an energy management system (EnMS) in the hospitality industry in line with the ISO 50001 standard. The new proposed model, specifically developed for service organizations, was based on the Plan–Do–Check–Act cycle and was confirmed in 280 hotels in the Western Balkans 6 (WB6) region. The data were used to investigate if hotel properties represent an influential factor in the wider implementation of EnMS requirements. The proposed model, based on the ISO 50001 standard, was developed into sub-categories, including actual regulations and legislation within the EU and WB6. Hotels, as some of the most energy-demanding buildings, due to their purpose and processes, should provide their guests with electricity, hot water, heating and air-conditioning every hour of every day. The survey was conducted in 280 hotels and lasted from December 2021 to September 2022. The research shows that the average implementation of EnMS requirements was 38.07% for the whole researched sample, i.e., 25.86% in Albania, 30.40% in Bosnia and Herzegovina, 26.11% in Kosovo, 46.34% in Montenegro, 29.86% in North Macedonia and 44.56% in Serbia. In the researched case study, the average implementation of the PLAN phase (phase for establishing basics for energy management) was 35.71%, implementation of the DO phase (phase for implementing energy management processes) was 44.90%, implementation of the CHECK phase (phase for monitoring and the measurement of energy performance) was 45.45%, and finally, implementation of the ACT phase (phase for reviewing and improving energy management) was only 25.36%. The proposed model is significant as it can be used for broader research to investigate other business sectors in hospitality and for policymakers to propose energy consumption strategies and measures for energy savings that would have a minimal impact on service quality. The novelty of this research can be seen not only in the specifically developed model for service organizations in the hospitality sector but it also contains current data from the verified model in one specific region which offers the possibility of benchmarking and evaluating one's own organization.

Keywords: energy management; hotels; ISO 50001; resource management; sustainability

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1. Introduction

Hotels represent significant energy consumption since these buildings require certain amounts of energy every hour of every day so as to provide quality heating, air conditioning, hot water and electricity to their quests. According to [1], most hotels are high energy consumers, as their energy use can be more than 400 kWh/m^2/year. Studies suggest that average energy consumption in hotels should be in the range of 305–330 kWh/m^2/year. Energy consumption in hotels varies in different countries and regions, along with their readiness for sustainable operations and acceptance of new trends in renewable energy resources. According to data in the UK [2], the hospitality sector in the UK spends approximately GBP 1.3 billion in annual energy costs, and in the USA, hotels spend USD

2196 per room each year on energy, which is approx. 6% of all operational costs [3]. In order to have a complete picture of energy costs, for a standard holiday hotel that has between 50–150 rooms, for the guest room areas alone, the average energy consumption per day was calculated to be in the range of 2500–7500 kWh. SPAs, lobbies and restaurants are not included in this calculation. To put this data into perspective, the average UK family consumes 3100 kWh of electricity over the entire year. It is important to emphasize that the average electricity wholesale price in the EU, for example, went from approx. 35–55 EUR/MWh in January 2020 to 300–440 EUR/MWh in July 2022, and it is expected to be even higher in the following months [4,5]. Taking into account the high electricity costs and the unstable energy market, daily energy consumption has to be identified, re-examined and re-evaluated with high priority in order to enable the hotel industry to survive in such challenging times and to adapt to frequent changes in the energy market.

For sustainable tourism development, it is inevitable to include energy use in both contexts: energy consumption within the destination of the consumers (hotels) and energy consumption needed to travel [6]. For more than 30 years, the environmental problem caused by tourism has been discussed and analysed, focusing on energy demands and CO2 emissions [7]. Proper resource management and energy consumption have been introduced as the core of the business for tourism in China [8], the Mediterranean [9], New Zealand [10], the Balearic Islands [11], the Maldives [12], Portugal [13] and Taiwan [14,15], along with strategies for energy savings [16–18].

One of the most important factors for hospitality is customer satisfaction. This is the reason why authors have analysed customer perceptions of green hotels that are recognized as energy-responsible consumers and environmentally aware organizations. Green hospitality perception research has been performed in the US [19–21], in India [22], in Korea [23], in Taiwan [14] and in Southeast Europe [24]. An analysis performed in Serbia showed that green business practice applications in hospitality have a significant impact on customer satisfaction [25].

Identifying green or eco-hotels has shown that, since bigger hotels are more sustainable, their businesses fulfil the criteria to be awarded the Green Key more easily [26,27]. In Serbia, the first Green Key was awarded in 2015; there are a few other hotels recognized as green [25], yet not as many as in Slovenia and Croatia, which were not included in the analysis. Eco-labelling in tourism should consider all processes [28] and aim to highlight green businesses in the hotel industry so as to have a positive impact on the environment and strive towards sustainable tourism [29–31].

An analysis of eco-responsibility, which represents one of the green criteria and its impact on business excellence, was performed in hotels in Serbia, Bosnia and Herzegovina and Montenegro [32]. The research showed that practising ecological activities did not affect the business excellence of the analysed hotels. An analysis of the most influential parameters for energy consumption in the industry in Serbia showed that the size of the organization, the implementation of ISO standards and, especially, Environmental Management System implementation have a significant impact on proper energy management [33,34].

EnMS implementation in industrial organizations has been broadly analysed, but analysis has mainly focused on the manufacturing sector. In one study, an ISO 50001-based EnMS model was selected and examined in Serbia regarding industrial manufacturing organizations, showing the average level of EnMS requirement implementation in the industrial sector was 59.05% [35] and only 33.45% in the wood industry sector [36].

The Western Balkans 6 Chamber Investment Forum (WB6 CIF) represents a joint initiative of chambers of commerce and industry from Albania, Bosnia and Herzegovina, Kosovo, North Macedonia, Montenegro and Serbia who share the aim of providing new opportunities for stronger networking in the business communities within the region and improving the business and investment climate in the markets of the WB region [37]. The present research was performed within WB6 CIF with the aim of analysing the current state of the region and summarizing the aspects related to tourism market, transport, cultural offerings, economy, industry and sustainability [38].

There has been no published research conducted in WB6 using a model in line with ISO 50001 and concerning energy management indicators, especially in the hospitality sector. The main objective of this study is to identify the current state of EnMS in the hotel sector within WB6 to use the results as scientific data for the improvement of the national policies of the analysed countries, national strategies for developing the hospitality sector within each country and to educate people about energy management in service organizations. In addition, the hospitality sector in the analysed countries can utilize the provided data as a benchmarking tool to compare their own results with the average within the country and the region. The data could also be used by other countries to benchmark their results.

This study is novel not only considering the fact that there has not been any study focusing on EnMS based on PDCA in service organizations, especially in hotel sectors, but it also proves the new, modified, ISO 50001-based model, specifically developed for service organizations in the hospitality sector. In this study, we have provided a verified model in order to synthesize this gap in the greater interest of academia. By conducting the survey and collecting data, we want to highlight the current situation, which is not promising in the WB6 region even though there are constant investments, and new hotels are built and opened every year. On another note, this study could help hotel managers and maintenance engineers by allowing them to figure out improvement options for their energy management activities and supply chain systems, as well as in managing the business process. In addition, as was mentioned, the available options for policymakers to address energy management regulations are also presented in this study.

This paper is structured as follows: Section 1 defines the research context and reviews the current state-of-the-art and recent relevant literature; Section 2 presents a literature review; Section 3 discusses the methodology of the research; and Section 4 presents the main finding of the analyses, i.e., the energy management implementation according to the proposed EnMS model based on the PDCA cycle. Section 5 presents the discussion of the results, while the summary of the study is presented in Section 6.

2. Literature Review

The ISO 50001 standard [39] is mainly used in industrial processes to reduce a company's energy consumption, as well as to provide cost management and decrease greenhouse gas emissions [35]. The advantages of certifying the ISO 50001 standard have been identified in national, local and global policies [40].

There are many studies about EnMS based on the ISO 50001 standard in industrial sectors, such as on energy performance improvement after the implementation of the ISO 50001 standard; CO_2 reduction [41]; the improvement of processes in supply chains [42] in the plastic industry [43]; and energy savings in the food industry [44], in kraft pulp mills [45], in the dairy industry [46], in cement industries [47–50] and in energy-intensive industries [51].

Specific studies on EnMS implementation levels have been performed. In Turkey, regarding the industries of steel, iron, paper, ceramics and textiles [52], it was found that the energy management adoption level was 22% for companies that implement energy management requirements. Then, in Sweden, results indicated that 40% of paper manufacturers had implemented energy management practices [53]. In Danish companies, EnMS requirements were applied by 3–14% of companies in different manufacturing sectors [54]. In Serbia, in manufacturing, the average implementation level of EnMS requirements was 59.05%, and full implementation was found in only 5.8% of companies [35].

The ISO 50001 PDCA model was used and verified in Spanish companies [55], considering an analysis of motivations in deciding to adopt an EnMS based on ISO 50001, while another study [56] analysed motivation to implement it with respect to the benefits and difficulties.

When defining the model within the ISO 50001 standard, in the academic literature concerning industrial applications, the following criteria are included: checking; auditing;

recording; and controlling energy flow to provide minimal energy consumption and to contribute maximal energy productivity [57–61]. Studies that have analysed the minimal requirements for EnMS implementation and operation in industries define long-term strategic plans, energy policies and energy-saving targets, as well as energy audits, to explore energy savings and planning, the implementation of energy-saving programs and top management commitment [53,59]. Other studies consider planning and the implementation of energy-saving programs to be minimal requirements for EnMS implementation [52,54]. By analysing the minimal requirements for EnMS implementation, the adaptation of the model is not significantly changed, even considering applications in different sectors [62]. The analysis presented in [54] emphasized two specific factors significant to categorizing companies based on EnMS requirement implementation: company size and energy intensity.

The authors of [63] developed an innovative, data-driven framework utilizing machine learning models to implement effective energy management systems in energy-intensive industries to comply with ISO 50001:2018.

Managing energy consumption in municipalities represents an important part of local energy and climate policy. One study included an approach where 28 European municipalities established energy management systems [64]. Another study presents the application of an energy characterization method based on the ISO 50001 standard in a dry paper production plant, including combining energy management indicators and life cycle assessment indicators [65]. An alternative for establishing energy baselines for the industrial sector and where the energy consumption of each product was identified was presented in [66]. The presented method was applied to the plastic injection process, and the result was an energy baseline in accordance with the requirements of ISO 50001. In the field of tourism, casino hotels were analysed in [67]. An EMS for green casino hotels was developed by using EMS indicators from ISO 14000 and nine representative green hotel evaluation systems. The study [68] tried to link EnMSes (specifically, ISO 50001) and energy audits in two industrial and two tertiary sectors in Italy. In this paper, an investigation on the impact of energy monitoring systems and energy management systems on planned and implemented energy performance improvement actions was developed.

There are no similar studies in the literature on the level of energy management implementation in service organizations in the hospitality sector of the Western Balkan region, even though the subject is important and inevitable from a cost-effectiveness and environmental point of view. The presented research is intended to fill this literature gap and was inspired by [35,52] but with a different research sample concerning business processes.

3. Materials and Methods

The proposed model was based on the Plan–Do–Check–Act model presented in the ISO 50001 standard [39], along with a detailed analysis of the needs and requirements from a management point of view. The analysis was performed in conjunction with the management of the selected hotels in order to include their experience and knowledge and to implement the findings in the proposed model. The aim was to employ the Plan–Do–Check–Act model, previously established in the standard as applicable and easy to understand, and use it in a real environment, particularly in hotels, which are not organizations commonly analysed to identify energy-consuming processes. This analysis is considered to be significant, especially from the managerial point of view, and full insight is provided into the different areas of energy management requirements, and not just to quantify energy costs in the service industry. The model was created in order to provide an opportunity to quantify findings and provide benchmarks for other organizations, especially hotels in different regions and categorizations, and see if there is any practical solution to mitigate problems regarding energy savings.

The presented research was based on the results of a survey conducted in different hotels (3-star, 4-star and 5-star hotels) in Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia and Serbia. The number of hotels that took part in the research was 280. The research sample covered different territories in order to encompass developed

and less-developed regions, as well as the size of the hotels, their rates, additional ancillaries and the levels of their development. Different levels of applied regulations, depending on their characteristics, result in different approaches to the energy management system. It would be beneficial to analyse if the hotels with previously implemented ISO standards apply EnMS requirements at a higher level.

The research sample consists of hotels operating on the territory of Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia and Serbia, including foreign ownership. A database of hotels was formed by using the database of the National Registration Centre of Albania, the Registry of Representative Offices in BiH, the Kosovo Business Registration Agency, the Central Registry of the Republic of North Macedonia, the Chamber of Economy of Montenegro and the Business Registers Agency in the Republic of Serbia. It was important to adopt certain criteria as potential participants in the research, such as the following:

1. The hotel is registered as a limited liability company or an entrepreneur;
2. The hotel is active (not in bankruptcy or restructuring);
3. The hotel can be a local business located in the country, a domestic entrepreneur with representative offices abroad, or a foreign company located in that specific country.

The methodological steps are presented in Figure 1.

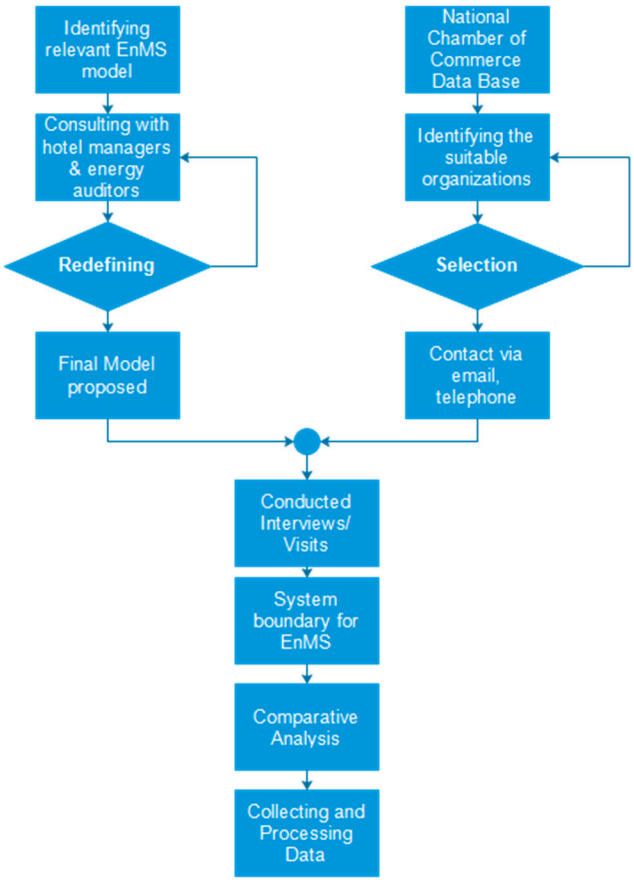


Figure 1. The methodological steps of the research.

In the research process, 445 hotels were contacted, and 280 responded fully to the questionnaire (with a response rate of 62.92%, or, by categorization provided, 5-star hotels, 25.71%; 4-star hotels, 64.29%; 3-star hotels, 10.0%).

To identify the level of energy management system implementation in the hotels, a survey was prepared according to the requirements defined in the international ISO 50001 standard, but it was specially developed for hospitality needs (Figure 2). The surveyed hotels also provided their ratings on booking.com (accessed on 11 November 2021) as one

criterion of customer satisfaction. The questionnaire used in this research is provided in the Supplementary Materials. The questionnaire consisted of three sets of questions:

1. General information about the hotel (star ratings, territory on which it is located, hotel ancillaries, level of development, company size, age of owned equipment, heating/conditioning areas, etc.);
2. Energy consumption information within the hotel (number of energy sources used, number of the most important consumers, annual energy consumption, etc.);
3. Information concerning the needed requirements for the implementation of the energy management system, grouped into categories based on the PDCA model from the energy management model in the ISO 50001 standard. Thus, a qualitative analysis was conducted regarding each phase of energy management model implementation.

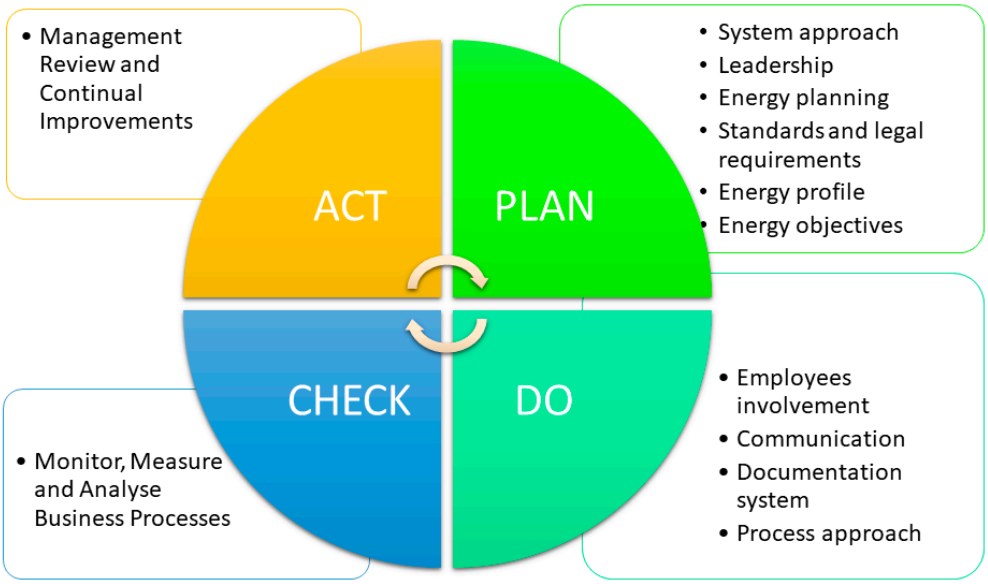


Figure 2. EnMS PDCA model comprising 12 groups.

While creating the general hypotheses of the study, the challenge of implementing the EnMS, as well as financial constraints in WB6, were taken into account:

General hypothesis (X1): In WB6, energy management practices are applied in less than 20% of hotels.
Specific hypothesis 1-1 (X1-1): Hotels that have implemented management systems, apply EnMS requirements at higher levels.
Specific hypothesis 1-2 (X1-2): The level of requirement for the implementation of an EnMS depends on the size of the analysed hotel.

The collected data were analysed by using a statistical method. The average, standard deviation and minimal and maximal values were calculated for the analysed parameters. A Likert scale was used to measure the implementation of EnMS requirements from 1 to 3 (1—do not agree at all; 2—partially; 3—completely agree), according to the categories defined in the model (Figure 2). For data analysis, the Mann-Whitney U test and Kruskal-Wallis test were used. The profiles of researched hotels are provided in the next section.

The conducted research and collected data were significant to proposing a model for implementing EnMS in a specific hotel, since the majority have not implemented an EnMS (Figure 3). Having in mind the specificity of the analysed region, the proposed model was adapted to small hotels with limited investment possibilities but a willingness to strategically improve their businesses.

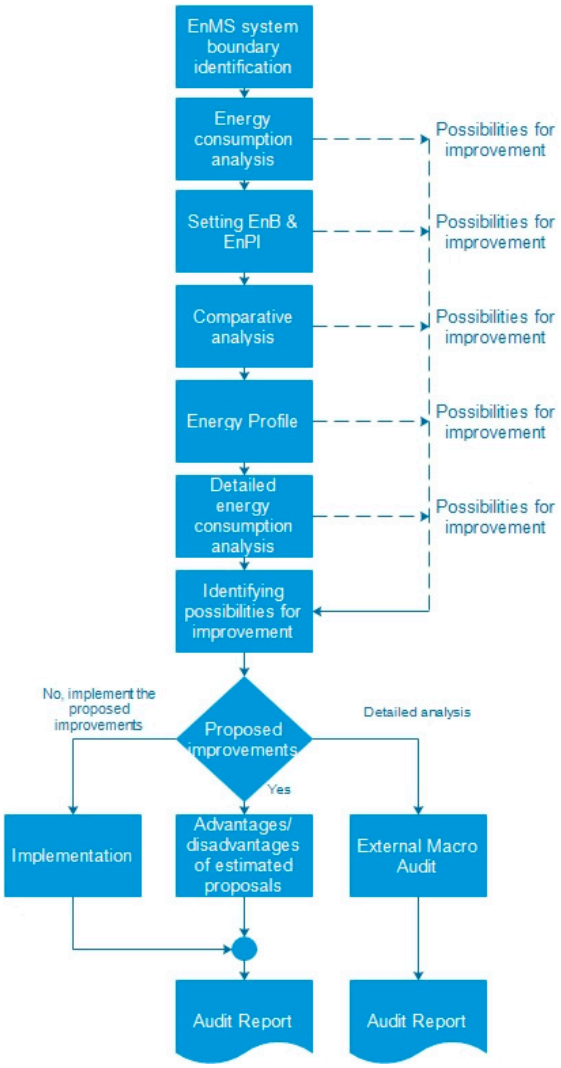


Figure 3. The proposed EnMS in a specific hotel.

As a first step, it is necessary to define the EnMS boundary and to list all significant energy-consuming processes, including equipment/machines. Energy flows are proposed to be qualitatively identified and then sketched by walking through the site. The next step is to collect different types of data in order to quantify the energy flows, such as energy bills, machine/equipment specifications, equipment usage reports, maintenance reports, etc. Due to the lack of any energy metering system, the most challenging task is to break down energy consumption at the unit process level to define the Energy Baseline (EnB) and Energy Performance Indicators (EnPI) within the process. However, a rough estimation of load factor could be made based on expert opinions, equipment documentation or the published energy profiles of similar processes. To validate the estimation, the assumed load factors need to be considered to calculate different periods and compare them with the energy bills of that specific period. The comparative analysis can be then used to readjust the load factor assumptions. Step 8 starts with screening the proposed improvement measures to select a potential one. The auditor should review the detailed technical specifications and compare them with the limitations of the analysed process. A technical feasibility report can be generated, which includes all advantages or disadvantages of each proposed option. Another step is reviewing models with different scenarios, to compare the total energy consumption and specific process parameters. The potential for energy savings can also be predicted relatively accurately. By obtaining the cost analysis of each option, a financial feasibility study can be reported.

4. Results

In order to present the main findings and analyse the results of the proposed model, it was necessary to identify the profile of the research sample. Table 1 presents the main categories in order to easily follow the properties of the research sample, while Table 2 provides the main categories for each country within WB6.

Table 1. The hotels' properties in the research sample.

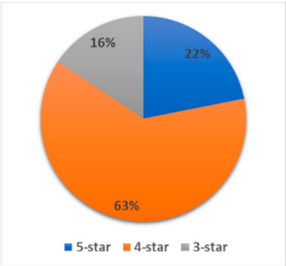
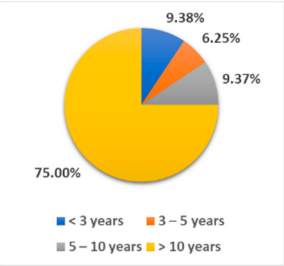
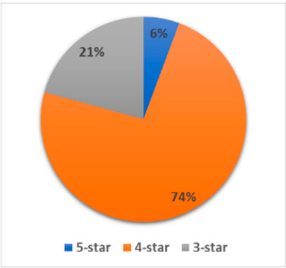
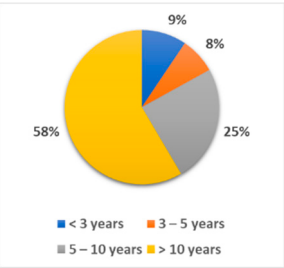
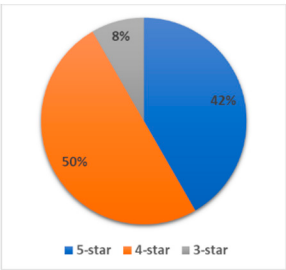
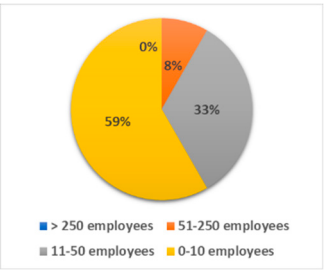
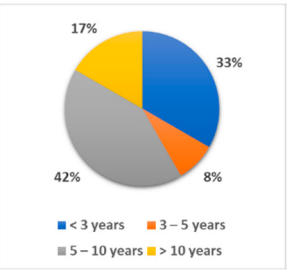
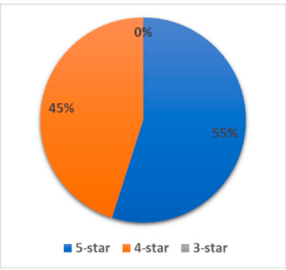
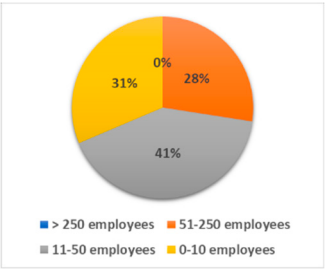
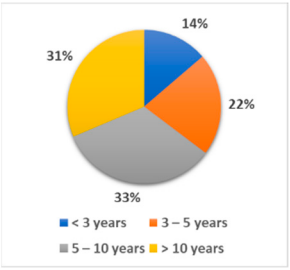
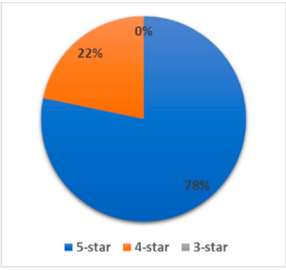
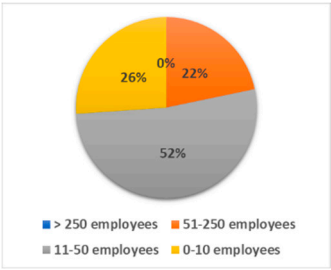
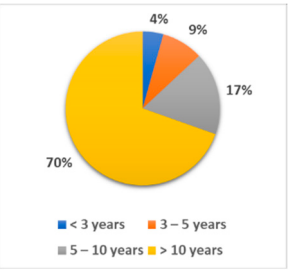
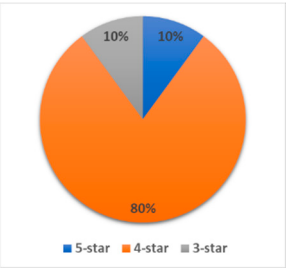
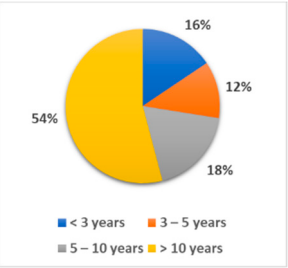
Variable	Properties	N	%	Chart	Impl. [%]	Implementation—Chart
Categorization	5-star	72	25.71		40.61	
	4-star	180	64.29		36.06	
	3-star	28	10.00		17.24	
Number of employees	0–10 empl	55	44.72		10.73	
	11–50 empl	34	27.64		31.60	
	51–250 empl	32	26.02		49.66	
	>250 empl	2	1.63		64.71	
Years on the market	<3 years	31	25.20		10.25	
	3–5 years	13	10.57		29.86	
	5–10 years	20	16.26		33.14	
	>10 years	59	47.97		33.27	
ISO 9001	Certified	79	59.63		47.70	
	Noncertified	44	40.37		16.26	

The general description of the research sample also includes data regarding hotel ancillaries, such as installed indoor/outdoor pools, SPA and wellness centres and the presence of a gym, as well as the possibility of organized gatherings, e.g., the presence of suitable conference halls. It was necessary to determine the energy profile of the building as well as the services the hotels have because these can influence energy consumption. The sample profiles according to each ancillary can be described as: hotels with indoor/outdoor pool(s)—39.64%; hotels with spa and wellness centres—50.36%; hotels with a gym—35.0%; hotels with a conference hall—36.79%. The data distribution was used to identify the dependence between the level of ancillaries present in the research sample and the level of EnMS requirement implementation.

The survey included data on the number of employees in the researched hotels. It can be noted that the majority included in the survey were very small hotels with up to 10 employees (39.29%), followed by the next category of 11 to 50 employees (37.86%), medium-sized hotels with 51 to 250 employees (22.14%), and large hotels with more than 251 employees (0.71%).

In order to gain insight into the research sample related to whether hotels are making efforts to apply standards to regulate certain aspects of their businesses, it was necessary to identify if the hotels had any certified management systems. The majority had implemented ISO 9001 (Quality Management System) (58.93%) in the research sample. The number of hotels that had not implemented any management system was 102 (36.43%). It was necessary to see how old the analysed hotels were, and the largest percentage of them (52.86%) have been present in the market for more than 10 years, while 13.21% of the sample has been present for only up to 3 years. Information regarding the age of the equipment installed within hotels is directly connected to energy efficiency, keeping in mind that the majority have been in business for more than 10 years. Old and non-serviced equipment is considered energy-inefficient and has an emerging impact on energy consumption. The majority of the hotels (56.07%) noted that the average age of the installed equipment/energy-consumers within the hotel was between 5 and 10 years; 28.93% owned new equipment of up to 5 years old, while 15.0% had equipment that is older than 10 years.

Table 2. The hotels' properties within WB6.

	Categorization	Number of Employees	Years on the Market
Albania			
Bosnia and Herzegovina			
Kosovo			
Montenegro			
North Macedonia			
Serbia			

To identify the energy profile, it was necessary to evaluate if hotels use different energy sources, such as electricity, natural gas, oil, solar energy, wind energy and geothermal energy. In the research sample, the majority (77.14%) used only one or two energy sources, while 22.86% used three, and none of the researched hotels used four different energy sources.

4.1. EnMS Implementation in the Hotels

According to the proposed model based on the PDCA cycle within the ISO 50001 EnMS, in the following section, the results are given for each country and for the whole research sample. It should be stated that the practised and performed research shows that, even though some hotels do not have a certified EnMS, they can still apply the necessary requirements or certain processes in some parts of the hotel.

4.1.1. PLAN Phase of EnMS—Establishing EnMS

The basis of an EnMS is defined through energy planning or the PLAN phase of the energy management model. Nevertheless, it was important to examine whether the lack of a certified ISO 50001 EnMS implied that the company did not apply EnMS in some parts or certain sectors of its business. The results show that the hotels apply EnMS to a considerable extent even when they are not aware of it. Namely, the average implementation rate of the PLAN phase was 35.71% within WB6 (22.94% in Albania, 28.30% in Bosnia and Herzegovina, 19.89% in Kosovo, 45.10% in Montenegro, 31.03% in North Macedonia and 41.39% in Serbia). A diagram showing the dependence of the percentage of hotels in WB6 and their EnMS requirement implementation levels in the PLAN phase is provided in Figure 4.

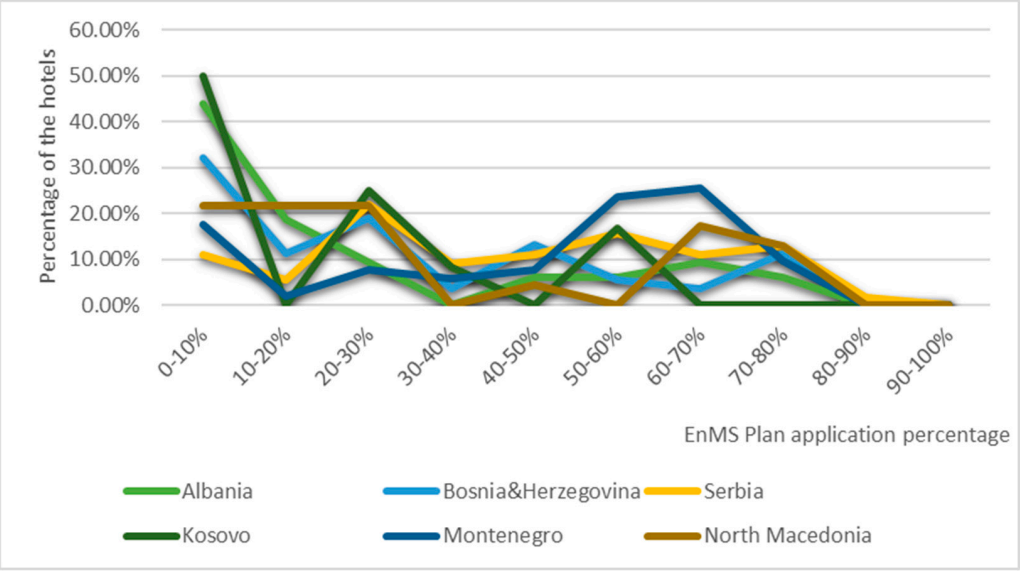


Figure 4. Application of the PLAN phase in hotels in WB6.

The average response regarding the implementation of the systematic approach is 42.50%. In the research sample, 42.68% of leadership/management is concerned with EnMS requirements. The responses in this part are as follows: 41.07% stated that management clearly assigns tasks and responsibilities to ensure the effective management of energy use; 41.61% highlighted that management promotes the importance of energy efficiency and effective EnMS; and 45.36% confirmed that management raises awareness of energy efficiency among employees.

The average response regarding energy planning is 35.65%, while 45.36% are, in part, concerned with standards and legal requirements and how they are connected to EnMS within the analysed hotel. Furthermore, 29.94% possess defined energy goals. Identifying

the energy profile of the hotel was especially important, so the findings could be used in order to address problems and make comparisons with the competition. The average response regarding the application of energy profile requirements is 28.57%. To determine the energy profile, employees should identify all sources of energy that are used and identify all energy consumers and energy consumption, as well as the condition of the equipment used by the hotel. It should be highlighted that only 13.57% perform energy audits to control and monitor their energy performance, while 17.50% have clearly defined methodologies and criteria to perform such energy audits. Less than 10%, specifically, 8.21%, possess a Green Energy Passport certified by the Central Register of Energy Passports. What is encouraging is that 53.57% stated that they have records of energy consumption in the past; 58.04% document energy consumption and energy losses in a specified period of time; and 31.79 consider opportunities to save energy and increase energy efficiency at regular meetings (monthly and quarterly).

Energy performance indicators are defined and monitored by only 17.50% of the participating hotels, while in 74.64% of the hotels, they do not exist. Energy use in service organizations is often measured and documented annually, per unit of output. In some organizations, mostly in industry, energy balances are made for each year, and larger manufacturers in industry often use software for this purpose. Procedures for monitoring indicators are defined by 13.57 % of the hotels, and 17.32% have established a baseline for future energy use comparison, where the energy baseline is the value measured in the previous day, month or year. The energy baseline is reviewed and changed by 8.21% of hotels in cases of new equipment being installed and changes in processes to identify if it is still appropriate or should be changed.

4.1.2. DO Phase of EnMS—Implementing EnMS

An integral part of the DO phase, related to ISO 50001, is based on the employees' involvement in the EnMS, communication channels within the hotel, documentation related to the EnMS and process identification significant for the EnMS. The documentation system should be seen as a guide on how to implement EnMS measures and, moreover, a report on the results concerning EnMS implementation. Communication between the hotel employees was seen as important not only for EnMS implementation but also for obtaining real data about the current state, problems and accidents related to energy consumption, leakage, losses in the system, etc. The average implementation rate within the research sample in the DO phase is 44.90% (Albania, 29.95%; Bosnia and Herzegovina, 34.36%; Kosovo, 34.03%; Montenegro, 56.37%; North Macedonia, 32.79%; Serbia, 52.79%). All defined requirements in the DO phase are implemented by 4.64% of the researched hotels, and the percentages of the hotels in WB6 and the levels of their EnMS—DO phase implementation are provided in Figure 5.

The first sub-group in the DO phase included the employees' involvement: 42.68% of employees include energy consumption data in their reports; 14.64% monitor, measure, document or report energy consumption during their work activities; 36.79% had attended and completed some training, course, lecture or seminar related to effective energy use and management. Communication between the staff regarding the EnMS was also analysed: 50.71% stated that information about energy consumption or energy savings was exchanged (at meetings, in mail correspondence, through reports); 62.50% stated that their managers encourage free communication regarding energy; 58.39% encourage employees to give suggestions and comments to improve the energy efficiency of certain processes.

Documentation management was included in this phase: 36.07% confirmed that their documentation is related to the EnMS (procedures, reports, activities, plans, instructions, measures, etc.), and 41.43% had clearly defined procedures for managing documentation related to the EnMS. The data that are considered to be significant is the fact that 62.68% were aware of the processes within the hotel that significantly affect energy consumption, and 62.68% can identify the process that should be subjected to corrective measures to increase energy efficiency. The hotel's management is aware of the current situation and

could deal with the problems. However, less than a third (26.61%) had clearly defined procedures that are related to the maintenance and operation of machines and equipment in the hotel (which may also include processes that are considered to have a significant impact on energy consumption).

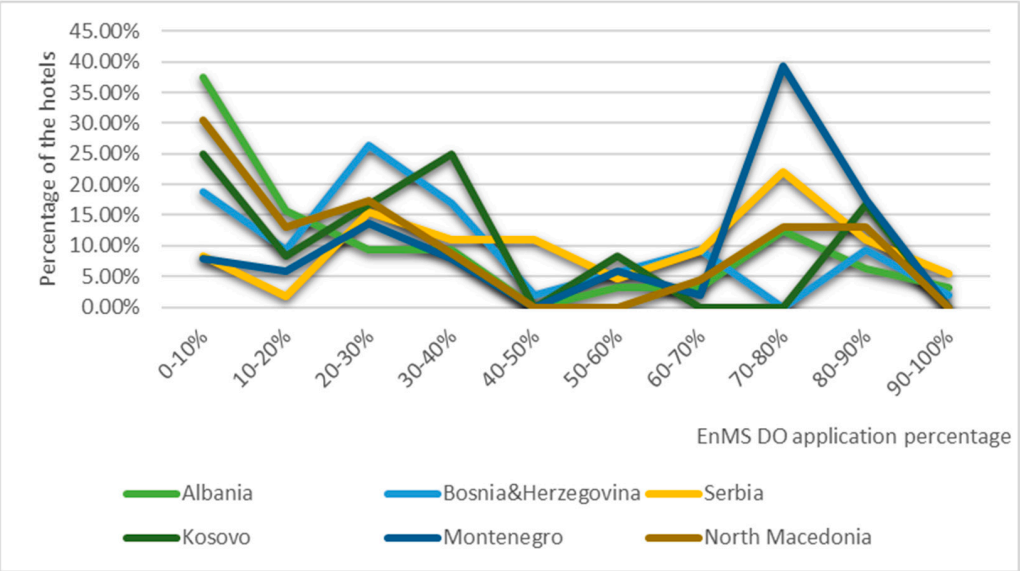


Figure 5. Application of the DO phase in hotels in WB6.

4.1.3. CHECK Phase of EnMS—Measurement and Monitoring Processes

Monitoring, measuring and analysing business processes within an organization provide quantitative process data and justify decisions about implementing necessary measures. Keeping in mind that fact-based decision-making represents an integral part of the CHECK phase and one of the principles of quality management, the provided data could be used for benchmarking and forecasting. According to [51], organizations do not define plans to measure energy performance or analyse energy indicators. Within the research sample, the general implementation of the CHECK phase is 45.45%; the average number of points is 7.27, and the standard deviation is 3.7. The average implementation rate is 36.72% in Albania, 38.09% in Bosnia and Hercegovina, 40.1% in Kosovo, 50.49% in Montenegro, 35.33% in North Macedonia and 51.95% in Serbia. In the presented research sample, 1.07% of the analysed hotels do not implement any of the requirements in the fact-based decision-making phase, and there are no hotels that implement all the requirements. The percentages of the analysed hotels within WB6 and the level of their EnMS CHECK phase requirement implementations are provided in Figure 6.

More than half (52.14%) of the researched hotels can identify the largest energy consumers, but only 13.75% can determine the current energy performance of the installed equipment, machines or sectors (for example, spas, restaurants, etc.). Within the research sample, 49.29% can estimate future energy costs and energy consumption, while 50.36% can identify and make a list of priorities to mitigate energy losses and improve overall energy efficiency. It is quite encouraging that 74.11% follow the development of new, energy-efficient equipment, which has better energy performance, and that 60.71% have personnel responsible for monitoring, recording and reporting energy consumption and energy savings in every possible way. However, only 11.96% of the hotels know how much energy is used daily, per m^2 of the hotel or per guest. Finally, more than half (51.25%) of the research sample hotels record significant accidents and deviations that are linked to variations in expected energy consumption and note the reasons that cause these deviations.

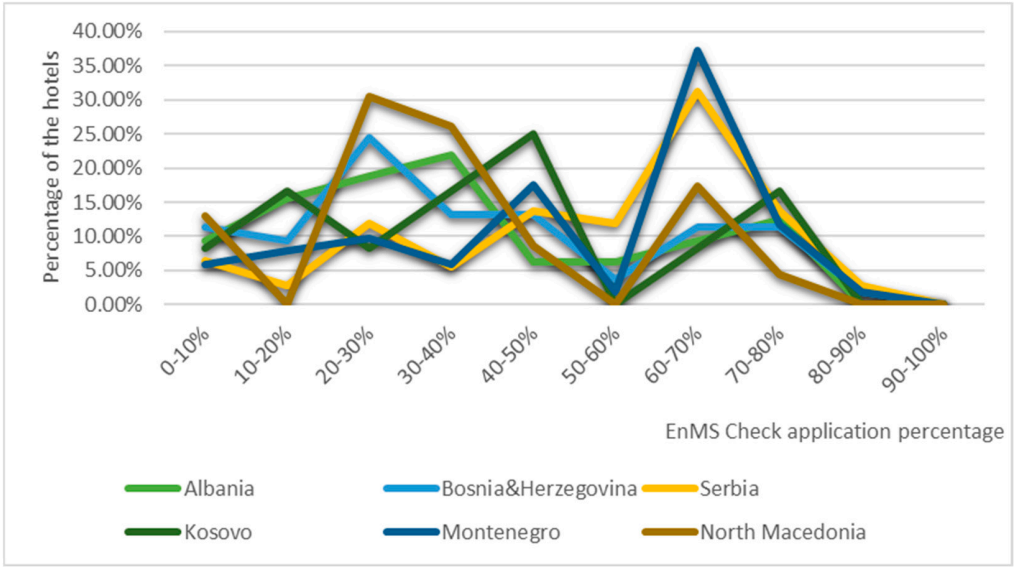


Figure 6. Application of the CHECK phase in hotels in WB6.

4.1.4. ACT Phase of EnMS—Review and Continuous Improvement

Management review and continuous improvement represent the core of the ACT phase of the EnMS. Management should deploy internal audits and/or reviews concerning their EnMSes to identify the current state of a hotel's energy performance and to consider measures for improvement. Within the research sample, the average implementation rate of the ACT phase is 25.36%, the average number of points is 3.55 and the standard deviation is 3.18. The average implementation rate of ACT requirements is 15.63% in Albania, 21.43% in Bosnia and Herzegovina, 16.07% in Kosovo, 28.29% in Montenegro, 14.91% in North Macedonia and 31.98% in Serbia. The distribution of analysed hotels within WB6 and the implementation level of their EnMS ACT phase requirements is provided in Figure 7.

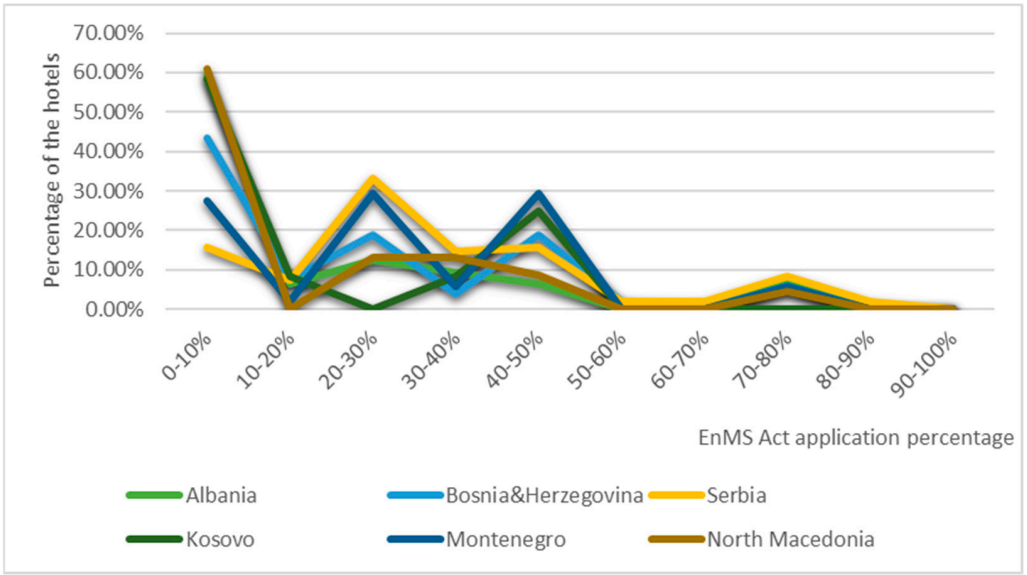


Figure 7. Application of the ACT phase in hotels in WB6.

In the present research, none of the analysed hotels fully review energy performance data or implement continual improvements, while 30.71% do not review the system and do not implement any action to improve energy performance. Overall energy management improvements in Western Balkan countries are limited due to the poor financial condition of opportunities to invest. In cases where improvements are implemented, they are planned,

and their realization takes a long time. In cases where projects for energy savings were implemented—such as the use of heat pumps, the introduction of photovoltaic cells on rooves or the installation of LED lighting—there were no documented data on energy performance improvement, and these hotels did not review energy performance in previous periods. The conducted research provided all the analysed hotels with data on how to measure, document and review energy performance, as well as data on how it is done in other, similar hotels.

About a third of the analysed hotels (36.07%) define procedures for management review related to the EnMS (energy consumption, energy savings, increasing energy efficiency), and 31.07% define corrective actions and/or plans to solve the current problems of energy consumption (on a quarterly and annual basis). The results show that 31.96% define preventive measures, actions and plans related to the EnMS, while 22.68% of managers define actions that will improve the process of production/providing services in terms of EnMS in plans for the next period. The most significant datum is that only 8.93% of the hotels have independent auditors that conduct internal energy management audits. Keeping in mind direct customer satisfaction with the services and accommodations in the analysed hotels, the fact that should be highlighted is that 28.57% of the hotels have noted that their customers' opinions have been formed on the basis of the rational use of energy and whether the hotel is "eco-labelled", while 28.21% believe that energy savings are directly connected to customer opinions/satisfaction/expectations. Considering the results in the ACT phase, the conclusion to be drawn is that managerial reviews and the continuous improvement of EnMSes are not widespread and that management should make an effort to implement an EnMS in most processes in their business and encourage employees to include EnMS measures in their daily activities.

In Figure 8, we present the overall implementation of the ACT phase in the analysed hotels. Full reviews and improvements to EnMSes are not present in any hotel, and very low implementation (0–10%) of such measures occurs in 33.57%. The average implementation of the ACT phase is 25.36%, which indicates that reviews and EnMS improvements are not disseminated properly.

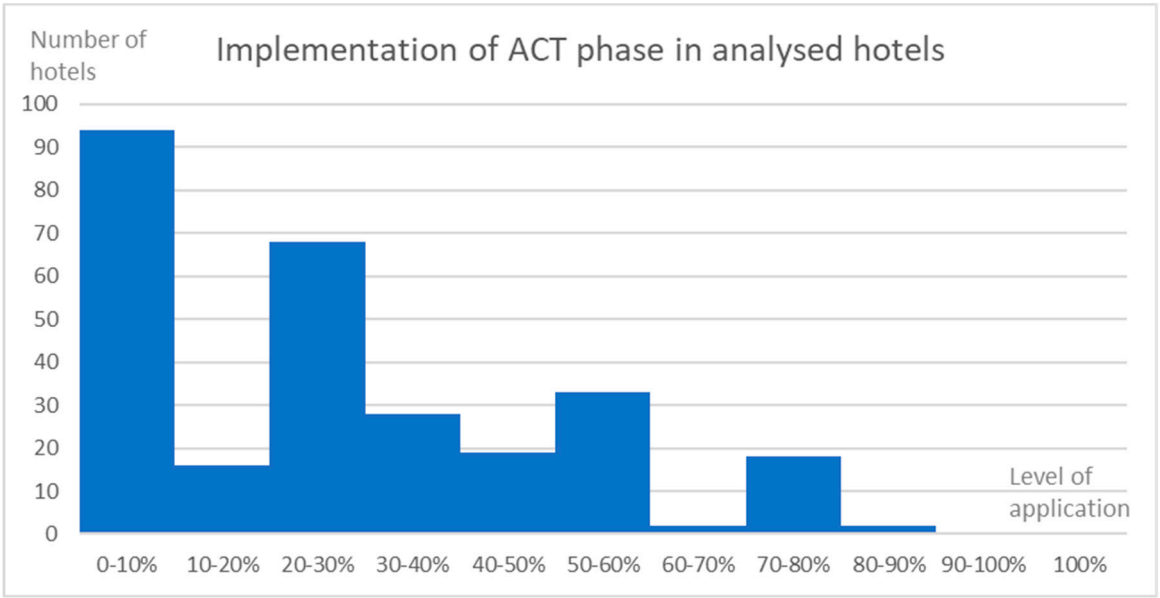


Figure 8. Implementation of ACT phase in analysed hotels.

4.1.5. Analysing the Connection between a Hotel's Properties and the Implementation of EnMS Requirements

The following analysis provides significant data regarding the dependence of a hotel's characteristics on the implementation level of its EnMS requirements. These hotel rankings

provide insight into the quality of the service, which can and cannot be connected to sustainable energy consumption. It was of great importance to analyse if the hotels with higher ranks had implemented EnMS requirements according to the given model at a higher level than the lower-ranked hotels. The Kruskal–Wallis test was used to identify differences in EnMS implementation in hotels of different ranks. The analysis shows a significant difference in EnMS implementation in hotels of different ranks (three-star hotels: median Md = 12.76%, sample—n = 28; four-star hotels: median—Md = 34.69%, n = 180; five-star hotels: median—Md = 60.71%, n = 72, test value—X2 = 34.7619, significance level—p = 0.0001).

One criterion that is interesting to consider is ISO 9001 certification. The Mann–Whitney U test was used to identify if ISO 9001-certified hotels applied EnMS to a greater extent. The results show that ISO 9001-certified hotels (median—Md = 65.31%, sample—n = 115) implement EnMS requirements at a higher level compared with ones without ISO 9001 certification (median—Md = 16.33%, sample—n = 165) (test value—Z = −13.42971, significance level—p = 0.00001). Specific hypothesis (X1-2) was, therefore, confirmed with this evidence.

Hotel size should have a great influence on the EnMS implementation level. It was assumed that larger hotels implement EnMS at a higher level. The Kruskal–Wallis test showed that there is a significant difference in the level of EnMS implementation between these four groups: hotels with more than 250 employees (median—Md = 84.18%, sample—n = 5), hotels with 51–250 employees (median—Md = 65.82%, sample—n = 62), hotels with 11–50 employees (median—Md = 32.65%, sample—n = 106) and hotels with fewer than 10 employees (median—Md = 17.35%, sample—n = 107) (test value—X2 = 104.4047, significance level—p = 0.00001). This analysis showed that larger hotels implement EnMS requirements at a higher level. Keeping in mind other similar analyses [35,36,69], the conclusion is that energy management practices definitely depend on a company's size, and specific hypothesis (X1-2) was confirmed.

The Kruskal-Wallis test was used to examine the dependence of a hotel's maturity on its EnMS implementation. It was concluded that there is no significant difference in EnMS implementation between hotels that have a different level of presence on the market.

5. Discussion

Our research results show that the average level of implementation of EnMS in hotels in the WB6 region is 38.07%, while full implementation was not found in any of researched hotels. General hypothesis (X1) was then confirmed concerning that in WB6, the energy management practices are applied in less than 20% of hotels.

The average implementation level of the PDCA cycle of the proposed model in each category for each member of WB6 is provided in Figure 9.

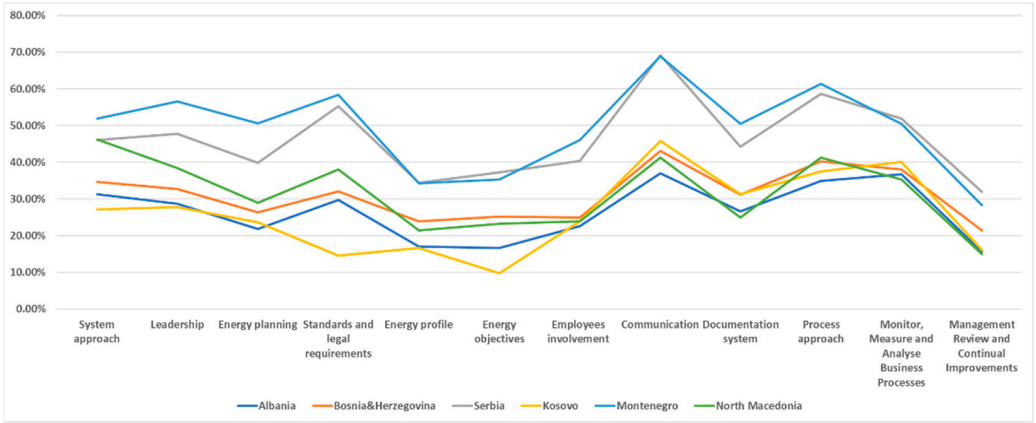


Figure 9. The average level of implementation in each category of the proposed PDCA EnMS model.

The results show that, in 44.64% of the hotels, the implementation rate of EnMS requirements is below 30% and that no hotel in the sample has fully implemented all EnMS requirements. Furthermore, 15% of the analysed hotels showed a complete absence of the implementation of EnMS requirements.

Hotels have not defined their energy profiles completely or considered energy performance in their design processes. However, communication on energy management and process analysis is considerably present, though an energy objective rarely exists; therefore, there is no energy policy or no management review system, and improvements in energy performance are rare, executed mainly for financial reasons. Based on the average data, the implementation of EnMS in WB6 hotels is presented in Figure 8.

Previously conducted studies on the implementation of EnMS in intensive industries show that, in Turkey, the level of implementation was 22% [52]; in Sweden, the level of implementation was 25–40% [53]; and in Denmark, the implementation level was only 3–14% [54]. In intensive industries in Serbia, the full implementation rate of EnMS was only 5.8% [35]. Service organizations have different approaches to managing these processes, as well as energy consumption and energy savings, which our study has justified. The full implementation of these requirements in the hotel sector was not found in any of the analysed countries, but the group of hotels in which the highest level of implementation was found (91–100% implementation) contains 3.12% in Albania, 1.89% in Bosnia and Herzegovina and 5.5% in Serbia.

The present study provides a scientific basis to improve national energy policies in the WB6 region and develop planning activities related to the implementation of the ISO 50001 standard in terms of sustainability for tourism organizations. This scientific basis can be considered significant since it examined service organizations, and the findings are crucial for inventing new approaches to achieving more sustainable results. Other stakeholders in tourism can utilize the data as a benchmarking tool to compare their results with the relevant ones in the analysed field or with the average values. The presented data could also be used and implemented in other countries, regions and sectors to benchmark results.

6. Conclusions

Keeping in mind that pre-knowledge about EnMS within the research sample was very poor, the managers that took part in this study showed great interest in being interviewed and asked that the proposed EnMS model for service organizations be modified. It was of great importance for us to obtain insights from the hotels' managers and observe parts of the business process that are not very transparent, such as energy consumption in kitchens and spas, water losses due to plants, etc.

In this study, a newly developed model for EnMS requirements within service organizations in the hospitality sector was proposed, introducing new categories within the PDCA model. The model was verified in 280 hotels from different regions in the Western Balkans. The research results are significant since no similar studies have been performed in this manner. The strength of this research lies in the proposed approach to identifying the level of EnMS implementation and in benchmarking the results with hotels of similar sizes, territory positions, ranks, etc. Future research can expand the second part of the model, developing it in order to propose a classification algorithm by using analytical tools, which could be implemented in different hospitality sectors, different environments and with different legal limitations.

The present study provides a scientific basis for improving the existing national and regional energy policies, planning activities with ISO 50001-standard implementation and providing an environment for sustainable tourism.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/su142416787/s1.

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