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Policies for Environmental Awareness in Tourist Accommodation. The case of Greece

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Introduction

Tourism is the third largest socio-economic activity in the European Union (Juul, 2015). Non-residential buildings represent 25% of the total number of buildings in Europe, with hotels and restaurants possessing 11% of it (Economidou, et al., 2011). The highest energy consumption in the tourist area can be found in the subareas of transportation and accommodation. Regarding the area of accommodation, there is a great demand for cooling/heating systems, lighting, laundry facilities, kitchens, swimming pools and salt water desalination (Coastlearn, 2019). Moreover, increased tourist activity in recent years has been putting pressure on the natural and the human environment since it results in an expansion of the building area and the necessary infrastructures, an increasing demand for energy, and perturbation of ecosystems (Parpairi, 2016). Furthermore, hotel accommodation is considered to comprise buildings of the tertiary sector with the highest energy consumption, as they are structures with various operational features and a large number of users (Farrou, 2013).

As regards Greece, tourism is the main pillar of economy, contributing to the country's GDB by 18% in total, possessing 23.1% of the total workforce in 2015 (WTTC, 2016). Electricity is the main source of energy used in hotel accommodation around Greece. It is used for air conditioning, lighting, laundry machines, tumble dryers and appliances used in the kitchen (Maleviti et al., 2011). Petroleum is the fuel ranking second in use, mainly covering the need for heating and hot water, while liquid gas is used for covering the same needs but in fewer hotels (ibid). Natural gas is used mainly in hotels located in urban centres, where there is access to natural gas supply. In addition to high energy consumption in the buildings of the tourism sector, there is also a high demand for water supply (Ghaitidak & Yadav, 2013). This phenomenon is crucial for some areas in Greece. Typical examples of such areas are those with serious water scarcity during the period of increased tourist activity. Such areas are the Aegean Islands during the summer months (Alexandri, 2012).



The importance of this issue is presented in a 2015 report of the World Economic Forum on global hazards, where water crisis is ranked as the greatest impact of hazards worldwide (Waterfoot-printnetwork, 2017).

On account of all these, modern economies have implemented green policies on the sector of tourism as a necessary step for sustainable development. After the 90s, environmental awareness programs like the "International Hotels Environmental Initiative" (IHEI) state the ever-increasing interest for sustainable tourist accommodation. The contribution of the sector of tourism in the field of energy efficiency has been expressed through Agenda 21 for Tourism and Travel Industry. Agenda 21 focuses on resource management and energy use in order to improve environmental standards. Despite the criticality of the issue, former studies lack sector specialisation, examining together different types of tourist facilities and accommodation (Becken et.al, 2001). One such example is the Commercial Buildings Energy Consumption and Expenditure undertaken by the U.S. Energy Information Administration (EIA, 1995). Another issue is the lack of comprehensive research on energy use patterns as far as tourist accommodation is concerned (Becken et.al, 2001). In the previous decades, various research programs based on pilot case studies aimed at the improvement of the ecological footprint of tourist accommodation. As for the European Union, policies associated with EU targets for 2020 and 2050, conclude to programs like the neZEH (Nearly Zero Energy Hotels). This program is considered to be a direct response to the European Directive on the energy performance of buildings (2010/31/EU, EPBD recast). Its scope was to foster large scale renovations of existing hotels into Nearly Zero Energy Buildings (NZEB). Greece as a member state of the European Union, participated in the neZEH program. However, a variety of interrelated factors affecting the role and function of the tourist industry in Greece sets barriers to energy efficiency.

Taking into consideration all the above along with the fact that in Greece there are no statistical data for energy consumption in the Tourism sector, this research provides useful information regarding environmental awareness in tourist accommodation. The aim of this research is not only to designate the implemented good practices but also to highlight the crucial factors that impede further development on the field. In this context, this research presents an assessment of the effectiveness of the Green Tourism Program which has contributed to the energy upgrading of the existing hotels in Greece during the period 2007-2013.

The methods used in this research include literature review on the issue of energy efficiency in tourist accommodation combined with analysis of official statistical data taken from the Hellenic Statistical Authority and the Ministry of Economy. Furthermore, field work was conducted in the area of Attica. To be more specific, following a request to the relative department of the Greek Ministry of Finance, unpublished data of the Green Tourism project were supplied and analysed by the authors. These data, presented in this paper, outline the situation in Greece regarding recent green strategies followed after the Kyoto Protocol. Moreover; the research has carried out an in-depth investigation into the case of the metropolitan area of the capital of Greece through field work. This area was selected as a characteristic case study because of the fact that there is significant tourist inflow throughout the whole year. Field work focused on qualitative research with the help of structured interviews addressed to the hoteliers involved in the Green Tourism Program. The thematic units of the questionnaire included the number and sort of completed interventions on the building shell, the application of renewable energy sources, the percentage of energy saving, the percentage of the reduction of water consumption and the percentage of capital amortization. The study draws useful conclusions concerning the policies implemented to date, providing guidelines for further improvement considering energy consumption of building shells in the tourist industry in Greece.

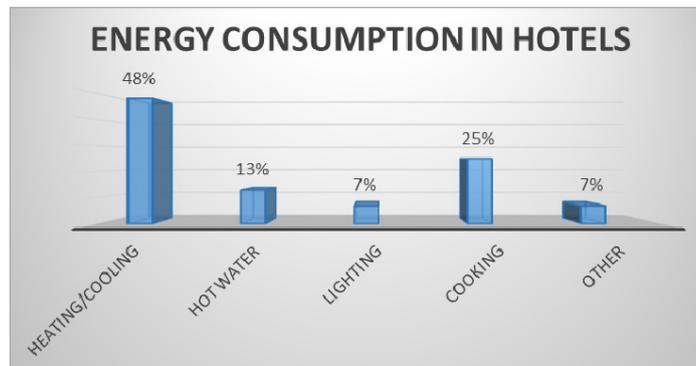
Methods

Results

Although hotels in Greece comprise 0,26% of the total number of buildings according to a study in 2007, they consume 29% of the energy consumed totally by the private sector (Maleviti etc, 2011). Consequently, they demonstrate very high rates of energy consumption, using mainly electricity and petroleum, as they keep a large number of different appliances and provide various services (ibid). More analytically, as illustrated in the Graph1, hotels in Greece display an average energy consumption of 290 kWh / m² / year, 48% of which is for heating and cooling, 7% is for lighting, 13% for hot water and 25% for cooking (neZEH, 2016). After the Kyoto Protocol, changes in European and Greek legislation led to a number of measures for energy upgrade and certification of buildings of all kinds of usage, including tourist accommodation. A concise analysis of relevant legislation is cited further below for a better description of the Green Tourism programme, which is the main policy of the country for upgrading hotel accommodation in terms of energy. The Kyoto Protocol recognises that developed countries are responsible for the emission of greenhouse gases and includes the necessary steps for a long run response to the challenges of climate change caused by an increase in

Graph 1

Energy consumption in Hotels in Hotels (neZEH,2016)



the man-made emissions of greenhouse gases (UNFCCC, 2019). According to this, the countries that have signed pledge to reduce gas emissions during the first period of assuming responsibility (2008-2012) by at least 5% by the year 2012 with specific actions according to the policy and measures to be defined (YPEKA).

Greece signed the Protocol in April 1998, together with the other Member States of the EU and the European Commission. All EU Member States sanctioned the Protocol in May 2002. Greece sanctioned it with the Law 3017/2002 (FEK A'117) (YPEKA). On this basis and with the aim to comply with the Kyoto Protocol and the agreement-framework of the United Nations for the climate change, the European Commission issued Guideline 91 (91/2002/EC) in 2002, where the term "Energy Efficiency of Buildings" was mentioned for the first time. In addition, measures for the reduction of energy consumption associated with buildings were suggested. Greece conformed to 2008 Guideline 91, when Law 366 (L.3661/2008, FEK A'89) was issued, where it was reported that the Regulation for Energy Consumption of buildings was to be set, which foresees the minimum requirements for energy efficiency of buildings. In 2010, the European Union issued Guideline 31 (2010/31/EU), where it was stipulated that after 2020 all newly erected buildings will have to be of zero energy consumption. Greece incorporated Guideline 31 into Law 4122 (L.4122/2013, FEK A'42), in which Energy Efficiency of Buildings was mentioned. In the same direction, with the aim to reduce energy consumption from conventional sources and promote sustainable development in the Member States of the Union, in 2010 the European Commission announced Energy Strategy "Europe 2020", which is widely known also as "Strategy 20-20-20" (Georgarakis etc,2017).

Regarding energy consumption of buildings in Greece, initially with the Presidential Decree of 1.6/1979 there was an introduction of the Regulation for Thermal Insulation of Buildings (R.T.B), which defined the requirements for thermal insulation of all newly erected buildings. In 2002, the Buildings Energy Efficiency Regulation (KENAK) was enacted, which replaced the R.T.B and defined the minimum energy efficiency requirements of buildings. In 2010, KENAK (K.Y.A 5825/2010) was issued. KENAK had been forceable from 2010 to 2017, when it was reviewed with FEK B' 2367/12-7-2017 and was replaced with the new KENAK, which incorporated the new European

Guideline 31 of 2010. The purpose of KENAK is to specify and institutionalize the energy planning of the building sector, according to the European instructions for saving energy and protecting the environment (FEK 5447/B/5-12-2018). KENAK configures a context of principles and rules with the aim to improve the energy efficiency of buildings by reducing the consumption of conventional energy for heating, cooling, air conditioning and lighting of spaces as well as the production of hot water for use, without disturbing the conditions of thermal and visual comfort (FEK B' 407, 2010). In this spirit, the "Green Tourism" Programme was an initiative of the Greek Department of Tourism, in the context of the "Competitiveness and Entrepreneurship" European Project 2007-2013. The main target was the support of investments in hotels and tourist accommodation of the Greek domain so that environmental awareness and corporate social responsibility of businesses would be developed, the services offered as well as their environmental performance would be upgraded and appropriate infrastructure would be created in order to fulfill the criteria required so as to be certified according to one of the existing Certification Systems for their environmental behaviour (FEK 2763, 2014). In this direction, the businesses interested were called to submit their propositions whose aim was to upgrade infrastructures and their operation ecologically, always taking into consideration both each place's geological features and each business's particularities (FEK 2763, 2014).

In a more detailed analysis, the Programme required a set of targets which had to involve the improvement of energy efficiency of the hotel and accommodation buildings resulting in saving energy, managing water and the waste produced by them as well as incorporating procedures of briefing and sensitizing everyone involved (entrepreneurs, employees and guests) to the environmental policy followed by each business (FEK 2763, 2014). As a result of the above, tourist businesses that would choose to apply directional interventions would enjoy reduced operating costs by adopting a system of ecological operation and certification, they would correspond to the increasing global trend for more ecological forms of tourism and would contribute to the protection of the environment (FEK 2763, 2014). Each business's investment project had to involve part of the eligible actions defined in the Programme, which followed five directions:

- _ Energy saving by improving energy efficiency of premises and using Renewable Sources of Energy (R.S.E.)
- _ Water saving by installing appropriate systems and applications
- _ Management of solid and liquid waste by incorporating appropriate technology applications and adopting a proper policy.
- _ Development of ecological systems of Management and certification of businesses for their implementation
- _ Briefing and promotion of each business's environmental policy as well as the green interventions it has made.

Following the submission of the investment projects and the approval of businesses that would be given a subsidy amounting to 45% of the investment cost, there was a time limit of twenty-four (24) months to make and present the interventions (FEK 2763, 2014). For the Coordination, Management and Implementation of the Programme's Actions, the "Intermediary Authority of Competitiveness and Entrepreneurship Business Project" was created (FEK B' 1690/2010 and FEK 352 B/19-2-13), named with the abbreviation EFEPAE. According to unpublished data obtained from EFEPAE, exclusively for the requirements of this study, there were two hundred and thirty-six (236) businesses approved nationwide, most of which are located in Crete (51), Central Macedonia (39), South Aegean (32), Thessaly (18), Attica (18) and the Ionian Islands (16).

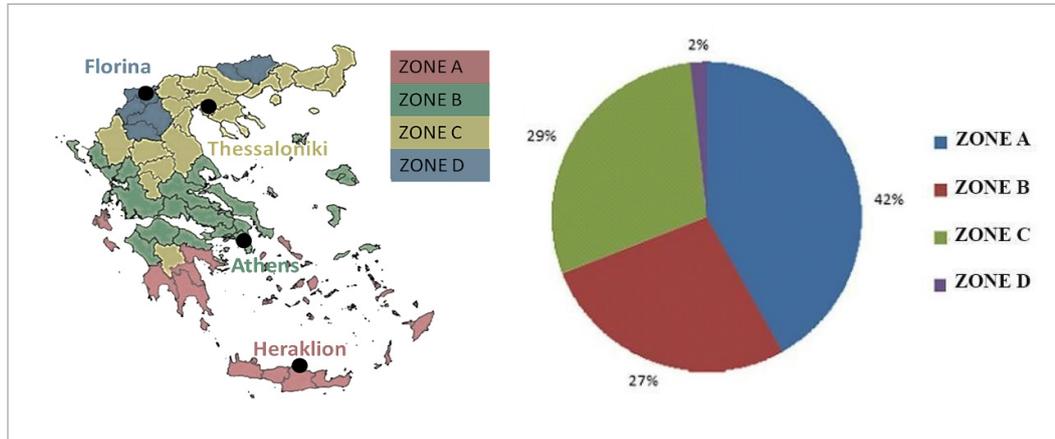
The interest shown by each one of the above districts in upgrading its hotel force perhaps can be correlated with the number of visitors (demand) they have during the summer and the occupancy

Findings

of beds they display. According to a study by the Hellenic Statistical Authority -ELSTAT (Map 2a), the highest rate of bed occupancy in hotel accommodation took place in Crete in 2017, followed by the Ionian Islands (63,7%), South Aegean (62%), Attica (50,5%) and Central Macedonia (49,1%). The island of Crete as well as the Southern Aegean area belongs to the hottest climate zone of Greece as described in Map 2, meaning that there is a great demand for cooling a/c systems during the summer, which results in high energy consumption.

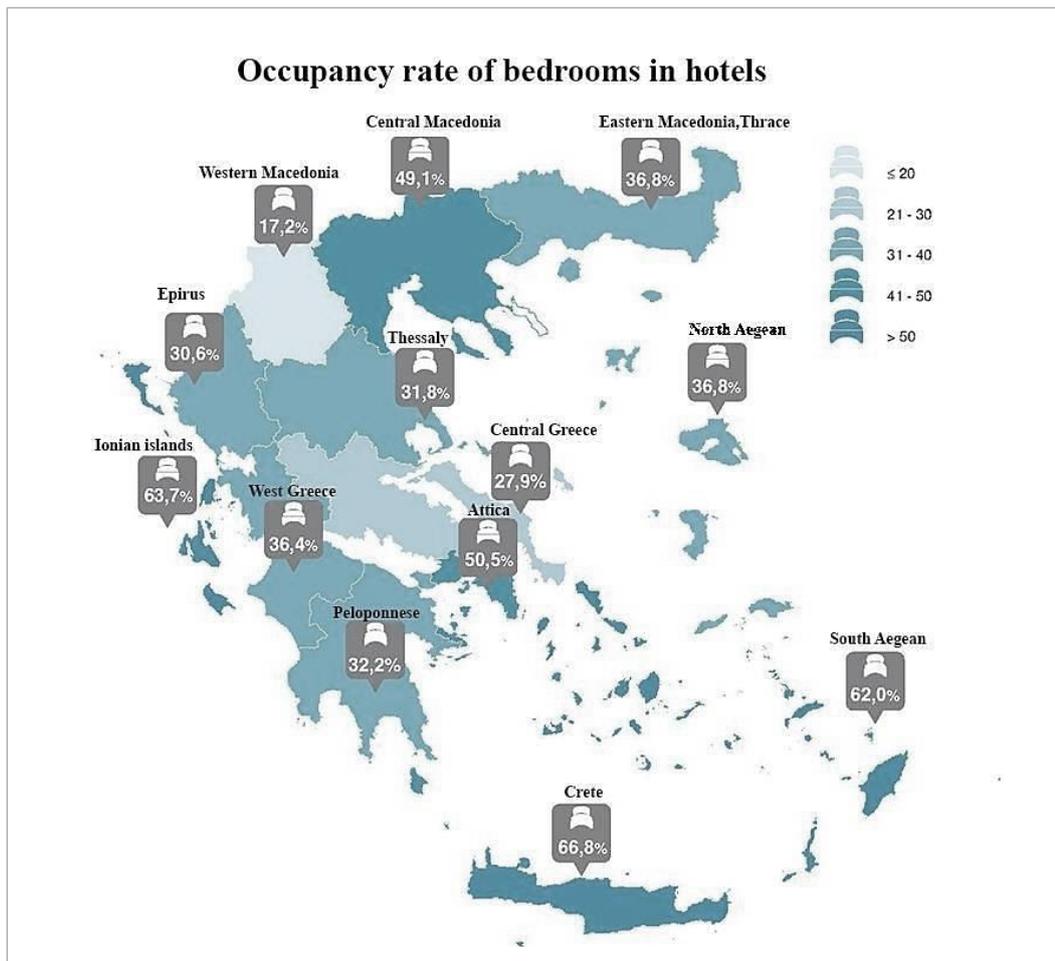
Map 2

Greek climate zones (Mitsopoulos, Bellos and Tzivanidis, 2018),
Bed occupancy on hotel accommodation per district, in Greece (ELSTAT,2017)



Graph 3

Percentage of hotels participating in the Programme categorized according to the climate zone, Authors' work



Of the hotels selected to receive subsidies, only one hundred and two (102) managed to complete the Project, most of which, as shown on **Chart 4** are located in Crete, Central Macedonia and South Aegean.

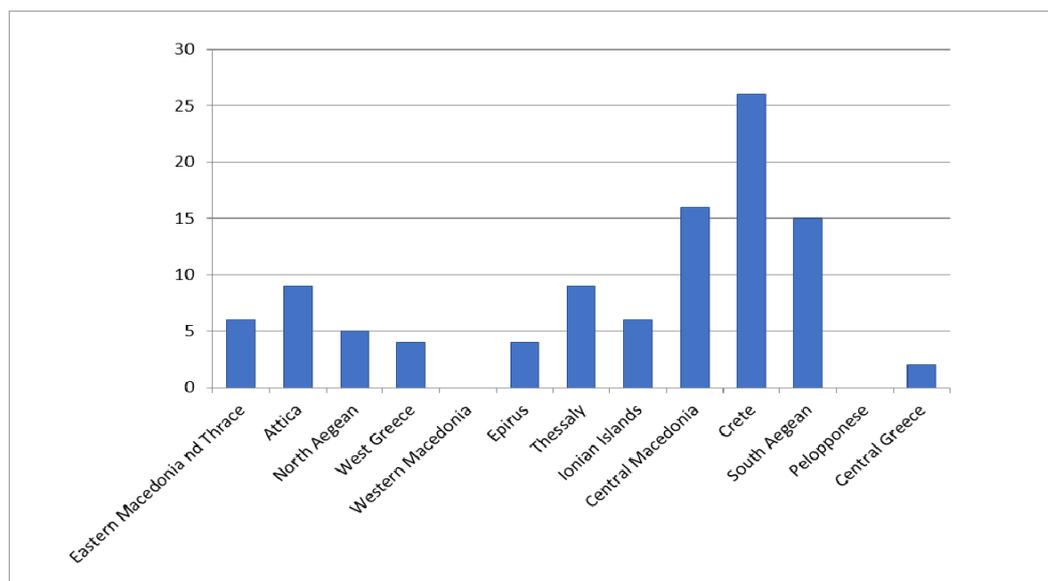


Chart 4

Percentage of the 5 proposed directions chosen by enterprises in each Region
(Source: data from the MINISTRY of FINANCE _ Authors' work)

Of the five directions proposed by the Programme, the one preferred the most was Category 1: "Energy efficiency upgrade and utilization of Renewable Sources of Energy (R.S.E.) with the aim of saving energy" (**Chart 5**). In the context of this Category, businesses had to do some (or all) of the following actions (FEK 2763, 2014):

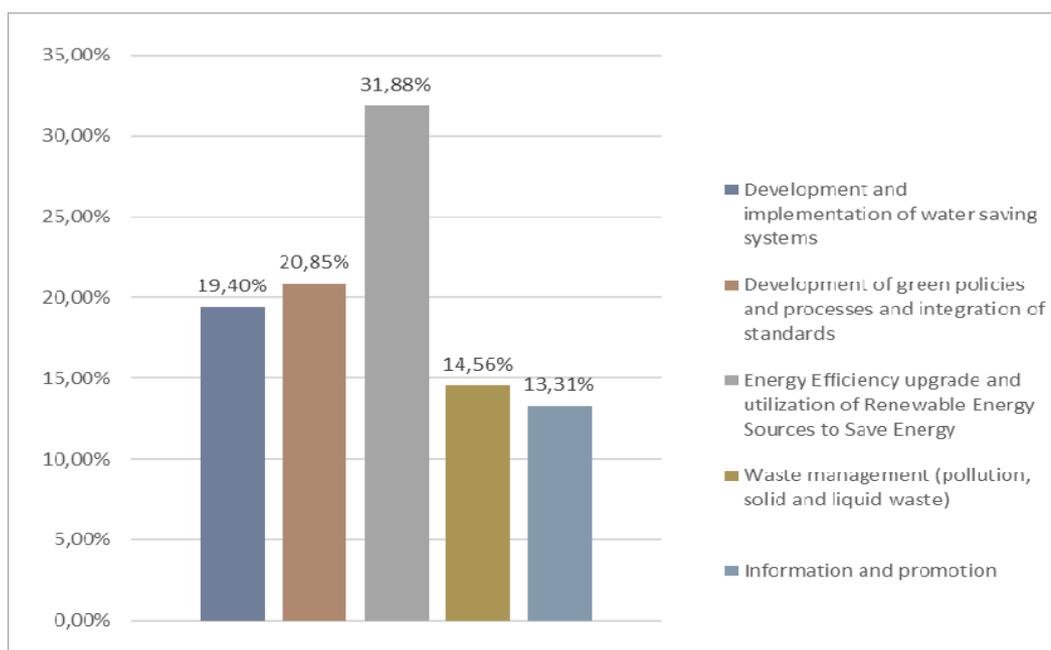
1. Energy upgrade of the building shell
2. Interventions for saving energy at the E/M facilities of the building and all other facilities
3. Upgrading the system of natural/artificial lighting
4. Replacement of electricity or other conventional fuels with natural or liquid gas
5. Installation of a system for a joint production of heat and electricity
6. Utilization of RSE for the production of heating/cooling or electricity
7. Installation of a system for energy management (BEMS)

The energy efficiency upgrade by utilizing GDB showed the highest percentage of choice (31,88%) among businesses in total, obviously with the relevant interventions in the building shell and electrical and mechanical system facilities (**Chart 5**).

This particular decision made by the hoteliers is undoubtedly related to the assessment criteria of the Programme, taking into consideration the fact that those whose Investment Plan aimed at saving primary energy, achieved the highest scores as depicted in **Table 6**. This decision increased their chances of eligibility and potential to receive a subsidy of up to 100% of the budget for certain tasks (FEK 2763, 2014). Together with the incentives for business ranking, we reckon that the high percentage of the above eligible expenses are to do with the immediate and, at the same time, permanent benefits resulting from these interventions, as they involve upgrading and renovating the existing buildings/building facilities as well as reducing operating costs of the business as a result of the reduction of energy consumption. Consequently, business owners moved primarily in this direction while aiming at recuperating their investment the quickest possible (it emerges from the reduction of operating costs), maximizing their profit and upgrading their property, which results in the property's added value being increased. In the second and third place of preference, was the

Chart 5

Percentage of the 5 proposed directions chosen by enterprises in each Region
(Source: data form the MINISTRY of FINANCE_ Authors' work)



development of green policies/procedures, integration of standards and the development and application of water saving systems (20,85% and 19,40% respectively) (Chart 5). These choices can be justified by the particularly favorable rating awarded by the Programme for Certification on the basis of certain standards primarily as well as for the reduction of water supply in the process (Table 6).

Table

Criteria of assessment and scores of businesses for Green Tourism Program
(Source FEK 2763, 2014_ Authors' work)

Assessment Criteria	Score of Businesses not required to keep accounts	Score of Businesses keeping accounts
Development of environmental standards		
Certification with ISO 1400 or EMAS or Easy EMAS and with Ecolabel	22	22
Certification only with EMAS/ Easy EMAS	18	18
Certification only with ISO 1400 or with Ecolabel	16	16
Primary energy saving and environmental criteria		
Primary energy saving (PES%)	20	15
Reduction of water consumption (from public water network) (RWC %)	15	12
Reduction of carbon dioxide emissions (RCDE %)	15	12
Reduction of litter/waste volume (RLWV)	13	10
Reduction of water consumption (from public water network) (RWC %)	15	12
Reduction of carbon dioxide emissions (RCDE %)	15	12
Reduction of litter/waste volume (RLWV)	13	10

Analysing the selected interventions, it emerges that hotel owners preferred to make drastic changes that concerned upgrading only the building shell. This approach is associated with the fact that such a choice upgrades their property both in terms of energy and aesthetics and results in an immediate reduction of operating costs. This means a quick recuperation of the investments and an increase in the value of the property. Regarding the remaining categories that concerned water saving and waste management, fewer drastic interventions were selected by simply acquiring new equipment/machinery that would save water and contribute to waste management respectively. Possible reasons for deciding on these interventions could be the following:

1. A lack of awareness among hotel owners regarding new technologies and a possible lack of expertise among the suppliers/installers responsible. The people in charge of each accommodation building opted for familiar and easy interventions without searching for innovative systems to which local installers may not be accustomed and which might have an increased cost of supply and installation in Greece.
2. The desire to avoid extensive intervention to the building, which could involve a long period of the hotel being out of service. Here, we ought to take into account that some districts, i.e. Attica, have an increased number of tourists visiting all year round, not only during the summer season as it happens with the islands. In addition, extensive intervention regarding the buildings in the historical center of Athens requires approval by many Authorities and Services, which in many cases is impossible due to legal issues or construction impediments (e.g. buildings protected by Law, old structures in which extensive interventions are not possible, etc).
3. Owners' low environmental awareness, which leads them to more superficial interventions owing to a more immediate financial effect and profit for them. Potentially, hotel owners' interest may not be the very reason for the existence of the Project, which is the Protection of the Environment, the reduction of pollutants emitted, sustainability etc, but the partial co-financed upgrade of their property with a simultaneous reduction of expenses.

As for the area of Attica, ten hotels managed to complete the suggested interventions. According to fieldwork, the majority of hotels that took part in the Green Tourism Program have given emphasis on the reduction of the electrical power consumption. Only two focused on water saving strategies. For the reduction of the electrical energy consumption most of the hotels upgraded their cooling-heating system with the help of geothermal techniques or/and replacement of outdated machinery. Two of them applied natural gas system combined with solar panels for warm water supply. Only one hotel has made interventions on the building shell so as to improve not only the energy efficiency of the building but also its aesthetic value (Table 7). Moreover, only one hotel replaced all the old light bulbs with new that contribute to energy saving. Regarding the strategies for water consumption, one hotel used special filters for water saving replacing all the old equipment (Table 7). Furthermore, all of the hotels described the interventions as beneficial for the hotel's function, mentioning that this might have contributed to a slight increase in tourists' preference. According to the field work conducted in the area of Attica, the reduction of energy consumption varied between 12 and 40%. The 40% was achieved by only one hotel that implemented a radical geothermal technique. The percentage of the water saving was rather low, varied from 10 to 20%. As for the capital amortization, only three hotels managed to gain profit from the investment, succeeding in amortizing their investment by 20-40%. All the other hotels that took part in the research present low percentage of capital amortization. According to the interviews, bureaucracy is the key-obstacle. In addition, small family businesses do not seem to benefit from this type of Programme since they use their own financial resources rather than conglomerate funding. As a consequence, the majority of hotels proposed larger amount of allowance as a critical factor for further development.

Discussion

Table 7

Data selected through field work regarding the interventions made with the help of the Programme Green Tourism in hotels located at the metropolitan area of Attica, the capital of Greece. The names of the hotels are not mentioned so as to provide anonymity to the participant of the qualitative research. (Authors' work)

HOTELS	Category according ot stars	Number of rooms	Number of beds	Interventions
HOTEL 1	4	80	144	<ol style="list-style-type: none"> 1. A/c for the whole building 2. external elevator for people with disabilities 3. Natural gas for hot water supply 4. Automatic watering at all balconies that have plants 5. Electric lightbulbs for energy saving 6. Special filters for water saving in all the wash-basins 7. Informative leaflets in the rooms that describe the interventions 8. New photocopy machines that save energy
HOTEL 2	4	25	77	<ol style="list-style-type: none"> 1. Thermal façade systems 2. (a/c) Inverter 3. Low energy consumption TVs 4. New low energy consumption refrigerators
HOTEL 3	no data available	no data available		<ol style="list-style-type: none"> 1. Interventions for energy saving 2. Water saving systems
HOTEL 4	4	38	78	<ol style="list-style-type: none"> 1. Solar panels for hot water supply
HOTEL 5	4	142	252	<ol style="list-style-type: none"> 1. Geothermal energy systems

Conclusions

Concluding with the intention of creating a “toolkit” of ways to save energy in hotels in Greece, we suggest the following steps and actions:

- Energy inspection/Issuing C.E.U. according to KENAK: The first step which will reveal the problems and energy consuming procedures of a hotel is the conduction of energy inspection by an eligible inspector. During an energy inspection, there must be proposed ways of improving the condition outlined and an action plan must be determined in conjunction with the owner, where the targets and priorities of interventions will be illustrated, always with a relation between cost-benefit in mind, defining the time period of the investment being recuperated.
- Interventions of energy upgrading. Subsequently, all the interventions determined during energy inspection must be carried out, with a view to reducing hotel energy consumption and the greenhouse gases produced.
- A second energy upgrade, where the new rank of the building will be defined and the current energy ranking will be illustrated.

The areas where energy can be saved in an existing hotel is cooling/heating the interior spaces, producing warm water supply and warming pool water (in case there is a heated pool), lighting, electrical appliances used and waste management. At the same time, raising guest and staff awareness of the environmentally friendly policy of the accommodation plays an important role further supporting the effort (i.e. not washing room towels daily) (Parpairi, 2016) and reducing possible waste owing to each guest's different sense of thermal comfort when given the option of regulating the room's cooling/heating systems manually. The best way in which a hotel could adopt a bioclimatic behaviour is by integrating R.S.E (heating solar system, photovoltaic panels,

wind turbines) (Maroulas, 2011) for the production of electricity and heating. Regarding lighting, although there was not relevant legislation up until recently, European guidelines are now followed in order to define energy efficiency of light systems, namely the amount of light (lumen) produced by a certain quantity of energy (Watt) (ibid). Despite the efforts made across Europe for a sustainable development of the tourist industry through European Guidelines and co-financed projects, like ESPA (i.e. Green Tourism), in Greece there is no relevant legislation yet to assess hotels on the basis of environmental criteria (Vasilatou, 2013). Assessment of accommodation as well as its classification by way of stars is usually carried out with quantitative criteria (size, beds, facilities, etc) and not qualitative ones regarding their environmental awareness (ibid). At the same time, for all interventions conducted by means of the “Green Tourism” Programme (apart from the three examples published on the Project’s web page) there are no quantitative data to prove the tangible upgrade of accommodation as well as the water and energy saving. In addition to this, hotels completing the procedure of upgrading through the Green Tourism Programme are very few in comparison with the number of the existing tourist accommodation businesses in Greece. Another crucial matter concerns the fact that the Hellenic Statistical Authority does not have data regarding emissions of greenhouse gases categorized by the type of tourist accommodation nationwide. According to all this, the Green Tourism Project may have been the most important policy for the improvement of energy efficiency of tourist accommodation in Greece; however, there are many steps to be taken until there is a considerable decrease in the environmental impact tourist activities have on countries like Greece, where tourism is an essential part of the economy.

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Acknowledgment

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