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Environmental performances in green labels for hotels – A critical review

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Abstract. The global attention towards climate change has led national governments and the international community to the definition of plans aiming to reduce greenhouse gas emissions in all economic sectors. Recently, attention has focused also on the tourism sector, and especially on the lodging industry, which consumes high amounts of resources and energy to satisfy guests expectations in terms of offered services and comfort conditions. In this sector, eco-certifications or green labels are spreading, perceived as useful marketing tools to communicate the hoteliers' environmental efforts to consumers, who are becoming more and more sensitive to ecological matters. However, the wide offer of green labels and the lack of appropriate information are contributing to increase costumers' confusion and perception of real "green". The present paper focuses its attention on a set of currently available tools to evaluate the environmental performances of hotels, in order to enquire if and to which extent they are able to inform about the sustainability of accommodation structures. Starting from the wide number of certification schemes available on the market, 19 multi-attribute, third-party green labels were compared, aiming to explore the role that energy efficiency measures play in the certification procedure.

Keywords: Low-Carbon Society, Green labels, Sustainable Tourism.

1 Introduction

The ambitious international goals to fight climate change require mitigation actions across all economic sectors, aiming to transition the current energy paradigm towards a more sustainable one [1]. Recently, attention has focused on the tourism sector, and especially on the lodging industry, which consumes high amounts of resources, products and energy, in order to satisfy guests' expectations in terms of offered services and indoor comfort conditions. Therefore, the concept of "sustainable tourism", coded by the United Nations World Trade Organization (UNWTO) and used to indicate a "tourism that takes full account of its current and future economic, social and environmental impacts" [2], is spreading, also as a result of the growing consumers' concern on environment [3]. Indeed, consumers and travellers are becoming more and more sensitive

to environmental and ecological matters, and, thus, hoteliers are interested in greening their businesses not just to reduce their operational costs, but also to promote their image and achieve greater market competitiveness [4-6]. Hoteliers have started to implement green practices, defined as "value-added business strategies that benefit a hospitality operation that engages in environmental protection initiatives" [7], with the scope of obtaining financial and commercial added value, while minimizing the environmental impacts of their businesses. Among the green practices to be potentially implemented, some have a direct impact on guests' experience, interacting with their usual behaviour in hotel structures (e.g. linen reuse, temperature set-point lowering, etc.), while other actions are directly implemented by hotel managers (e.g. adoption of renewable technologies, substitution of old generation systems, etc.), thus not being visible to guests [8]. However, it was found out that the more the hoteliers invest on environmental actions with altruistic purposes (and not just to obtain economic savings), the more the costumers' willingness to participate and pay increase [9]. Several researchers investigated on the importance of consumers' empowering and on the role of a proactive and genuine communication [3,6,10], and this effort justifies the spreading of eco-certification or green labels in the last years, which are perceived as useful marketing tools to communicate to costumers the environmental efforts undertaken by hotel managers [10]. According to [11], in 2002, over 100 tourism green labels were available worldwide, 60 of which just in Europe [12]. More recent data affirm that nowadays the number of tourism-related green labels exceeds the 140 units [13], and the number is expected to grow. However, whilst the wide offer of certification schemes is an indication of the interest upon environmental issues, it also leads inevitably to lack of credibility and growth of disorientation among both consumers and stakeholders. Indeed, the huge amount of certification schemes diffused worldwide, coupled with a non-explicit communication, does not help consumers in understanding if, besides advertisement purposes, they certify the real green behaviour of the accommodation structures. This phenomenon is identified with the term "green washing", which is defined as the use of false or unverifiable green claims to sell products or corporate images, leading consumers to make uninformed choices [14]. From stakeholders' standpoint, instead, similar confusion is perceived since, given the wide choice of certification schemes available to them, it is challenging to identify the most profitable ones. Due to the variety of fees and validity periods among the existing green labels, it is reasonable to assume that, to increase their revenues, tourism operators would prioritize the short-term decisions basing on financial aspects, rather than on sustainable features.

In the light of the above, the work aims to investigate the role of hotel-related green labels in certifying the actual energy and environmental performances of the accommodation structures. To do this, a critical review of a selection of voluntary schemes is provided, as a contribution to a more systematic and robust understanding of hotel-related green labels. A comparative analysis of the main features of the selected schemes is performed, in order to enquire if and to which extent green labels can inform about the sustainability of accommodation structures. Moreover, the paper attempts to explore the role that the energy performance of the buildings plays in the certifications. To this purpose the weight of energy efficiency in the selected labels is investigated,

considering as "energy efficiency" all the measures necessary to reduce energy consumptions and CO_2 emissions.

2 Basic principles of green labels

Green labels are voluntary-based certifications, awarded to goods or services in order to highlight their environmental advantages, downstream of a process of assessing compliance with pre-established criteria [15]. The rapid growth of green labels in the last 30 years has led to the development of programmes to regulate and standardize them. Moreover, following the success of the labelling of products and services, the concept was transferred to the building scale, where green labels have become powerful tools for informing people on the energy behaviour of their buildings, and thus for fostering the implementation of efficiency actions to reduce energy consumptions and emissions [16]. In line with the diffusion of building certification schemes, the "green building" concept has spread, for indicating efficient, healthy and productive buildings able to reduce their impacts during their whole life-cycle [17,18].

With an history of more than 30 years, nowadays eco-labelling programmes are widely diffused at national, European and international levels [19], and labels have become marketing tools that manufacturers and service providers are encouraged to obtain in order to maintain and enlarge their market share. Still, diverse terminology (e.g. "ecolabel" [19-21], "eco certification" [11], "environmental certification" [20]) and features exist. Green labels can be classified according to three main parameters [15]:

- Number of attributes. Labels can be: i) single-attribute criteria, in case the assessment focuses on only one environmental issue (i.e. energy efficiency, water or waste management); or ii) multi-attribute criteria, in case two or more environmental impacts are accounted for the overall assessment.
- Evaluation method. The environmental performance of a product, service or building can be evaluated with two main approaches: i) process-based scheme, in case some management activities are imposed in order to reduce the environmental impact (i.e. staff seminars to encourage energy savings practices); or ii) performance-based scheme, in case measurable results (i.e. energy consumption) are used for the assessment. Currently, most labels are hybrid, coupling these two evaluation methods.
- Valuation body. Labels can be subdivided into: i) third-party, if the assessment is performed by an independent evaluator; ii) second-party, in case an interest party performs the assessment; or iii) first-party, if the assessment procedure is performed by an organization that benefits from the claim. Generally, third-party labels are recognized as most trustable, thanks to the involvement of an external valuation body for conducting the product testing and awarding [11,15,19].

Nevertheless, all schemes share some basic features [15,22]. Green labels are voluntary based (thus differing from the Energy Performance Certificates (EPC) schemes [23]) and have a logo to be recognizable by costumers, awarded after an assessment procedure. Moreover, they all foresee the payment of tuition fees, which revenues are usually used for covering advertising and administrational cost.

3 Methodology

Purpose of the paper is to compare the requirements of different voluntary-based hotel-related green labels, in order to investigate if and to which extent they can inform customers about the environmental performance of the awarded accommodation structures. Much literature exists on the theme; several researchers dealt with green labels, some researching on the features of the single labels [11,15,19,22,24], and others comparing their characteristics [20,22,25,26].

A first research highlighted that a huge number of hotel green labels exists; typing "green label hotel" and "green certification hotel" on Google research engine, 386'000'000 and 129'000'000 results come out, respectively. To narrow the sample, a targeted online research was performed, selecting the labels based on four main parameters: number of attributes, valuation body, transparency and geographical competence. The review took into consideration only multi-criteria and third-party labels. Moreover, all were schemes with transparent and open source standards and guidelines for awarding the certification. Finally, the selection was refined according to the geographical competence, at the end of which 19 voluntary green labels were selected (see Fig. 1). 6 green labels are international: Building Research Establishment Environmental Assessment Method (BREEAM), Leadership in Energy and Environmental Design (LEED), Green Globe, The Green Key, Haute Qualité Environnementale (HQE), GreenLeaders TripAdvisor. The national-based green labels, instead, were selected in order to cover as far as possible all main geographical zones: Green Mark and Building Environmental Assessment Method (BEAM PLUS) for Asian countries, Green Star for Australia and New Zealand, Sello S for Chile, Green Seal for USA, Eco Tourism Kenya for Kenya, EU Ecolabel diffused in European Union, Nordic Swan in North Europe, Österreichisches Umweltzeichen für Tourismus for Austria and Germany, ECO Certification for Malta, Vitality Leaf for Russia, Green Hospitality Award for Ireland and, finally, EcoWorldHotel for Italy. Detailed data were gathered from online manuals. Specifically, per each label, information on number of released certifications, categories of environmental performance used, energy efficiency requirements implemented, scoring methods, validity periods and fees were collected.

Due to the diverse voices of environmental categories recorded, a systematization of the collected material was done, based on which it was possible to list the most common parameters treated in the hotel-related green labels. In the light of this, 11 environmental performance categories were identified, as reported in Table 1. To allow a comparison among the different labels in terms of relevance of the listed categories on the overall evaluation, (1) was used:

$$S_{w,X} = \frac{s_{i,X}}{s_{tot,X}} \cdot 100 \text{ [\%]} \tag{1}$$

where $s_{i,X}$ is the maximum score attributed by the green label x to the i-th environmental performance category and $s_{tot,X}$ is the maximum total score attributed by the green label x to the hotel building. For the labels not offering a clear division among the categories, the weighting estimation was not feasible.

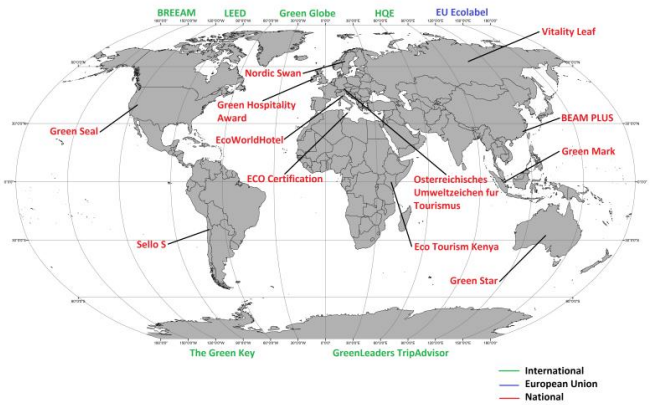

Fig. 1. Geographical distribution of the analysed green labels.

Table 1. Definition of environmental performance categories and areas covered.

Environmental performance category	Areas covered
Energy Efficiency (EE)	Energy management, efficient equipment and HVAC systems, adoption of renewable energy sources, etc.
Water Efficiency (WE)	Reduction of water use, management of exhaust water
Sustainable Site (SS)	Integration with natural environment, presence of green areas, use of vegetation native species, solar exposure, use of the soil, etc.
Waste Management (WM)	Reduction of waste production, increment of recycling rates
Indoor Environmental Quality (IEQ)	Thermal comfort, lighting, noise reduction, air quality
Health & Wellbeing (HW)	Daily products needed for guests' wellbeing (i.e. toiletries, towels, local food) and extra services eventually provided (i.e. fitness centre, SPA, swimming pools, etc.)
Materials & Resources (MR)	Sustainability of raw materials, percentage of recycled resources used in the construction phase
Pollution (P)	Life-cycle emissions of pollutants in air, water and soil
Transport (T)	Reduction of vehicle distance travelled, encouragement of public transport and bicycle use
Communication, Education & Management (CEM)	Empowerment of clients and staff through advertisement and training, current hotel administration
Innovation (I)	Advanced practices, innovative technologies and design

Specific object of investigation was the level of detail of energy efficiency (EE) requirements and whether these are compulsory or not for the achievement of the certification. Attention was devoted to the presence of minimum mandatory requirements on energy efficiency, which are among the most important aspects to consider when

investigating on the sustainability of green labels. Indeed, their presence reveals that the certification scheme is a real indicator of sustainability and not only a marketing tool. Indeed, in case energy minimum requirements are not present, it is possible that a service achieves the certification even completely skipping the energy requirements. To cope with the variety of accounted voices within the EE category, 12 sub-categories (identified with the code SC) were identified (based on the items present in the selected green labels), each representing an EE measure, which can range from technical interventions to purely managing activities. The sub-categories are reported in Table 2.

Table 2. Explanation of the 12 considered EE sub-categories (SC).

EE sub-category	Explanation
SC1	Retrofit interventions on building opaque envelope
SC2	Retrofit interventions on building glazed envelope
SC3	Installation and management of efficient electric equipment and HVAC systems, including tailored monitoring systems
SC4	Installation of efficient technologies for domestic hot water (DHW) generation and distribution
SC5	Presence and installation of advanced heat generation and recovery systems (i.e. district heating or cooling, heat pumps, cogeneration and heat recovery)
SC6	Presence and installation of efficient lighting systems and their automatic control devices
SC7	Presence and adoption of renewable energy technologies for heat and power generation
SC8	Compliance with the national and international regulations in terms of minimum energy performance
SC9	Energy management actions, in terms of Building Management Systems installed and long-term energy management plan
SC10	Planning of periodic energy audits or presence of energy monitoring systems for tracking the hotel performances
SC11	CO_2 emission reduction measures
SC12	Efficiency of wellness centre equipment (from the use of hand and hair driers with proximity sensors, to the presence of efficient heating systems for pools)

4 Results and discussion

The comparative analysis of the 19 selected green labels allowed drawing some interesting considerations upon their effectiveness in describing the environmental performances of a hotel. A coherent comparison among labels could be done only in terms of number of released certifications, according to which international labels (i.e. BREEAM, HQE, LEED) are recognized as the most widespread. Moreover, they appear to be more transparent with respect to national labels, when considering the availability of information open to public. The core of the comparative analysis was the

evaluation of the environmental performance certified by the hotel-related green labels. Although the considered macro areas (energy, water, waste, management and education) were similar in all the analysed labels, a standardization procedure was necessary, in order to define the most common categories. Fig. 2 synthesises their recurrence in the analysed labels, expressed as percentage of labels that consider a specific item. Energy Efficiency (EE) and Water Efficiency (WE) resulted to be the most diffused, being present in all the certification schemes. Among the voices, least attention was devoted to Pollution (P), Transport (T) and Innovation (I), all considered by less than 50% of the green labels. The same is valid for the Indoor Environmental Quality (IEQ) indicator, although being in contrast with the current emphasis put on IEQ theme by national and international institutions for the entire building sector [27].

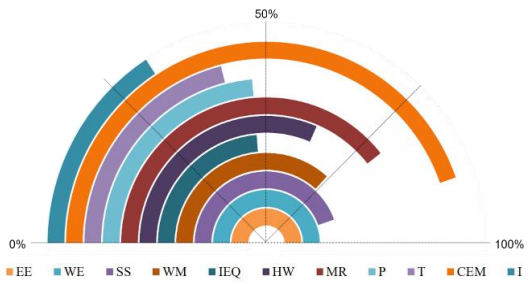

Fig. 2. Presence of categories of environmental performance in the analysed green labels.

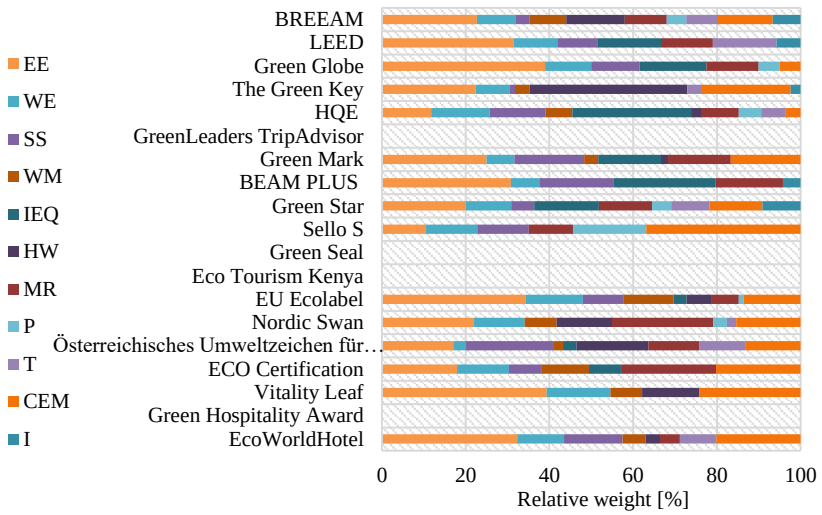

Fig. 3. Relative weight of each environmental performance category in the total score of the analysed green labels.

The average weighting method proposed in equation (1) allowed to partly overcome the mismatching between the different labels, creating a basis for comparison, and

allowing to analyse the significance of the EE category in the global rating. Fig. 3 shows that, for 9 out of the 15 labels for which categories were explicit, EE appears to be the most important category, accounting for 20% - 40% of the maximum score.

When detailing EE, the review results highlighted that green labels explore diverse sub-categories and define different compulsory requirements for the assessment procedure, thus not allowing a straight comparison among them, but asking for a critical interpretation. To cope with this, 12 sub-categories (see Table 2) were identified to generalize the voices encountered in the review process. Fig. 4 illustrates the number of green labels that comprehend the EE sub-categories; the dark bars represent the total number of green labels that include a specific sub-category, while the light ones identify those for which that sub-category is assumed to be compulsory to get the certification. It has to be noted that among the selected green labels, only two certification schemes do not have any minimum requirements (Sello S and Green Globe). BREEAM, instead, includes energy minimum requirements, but only for the highest levels of rating.

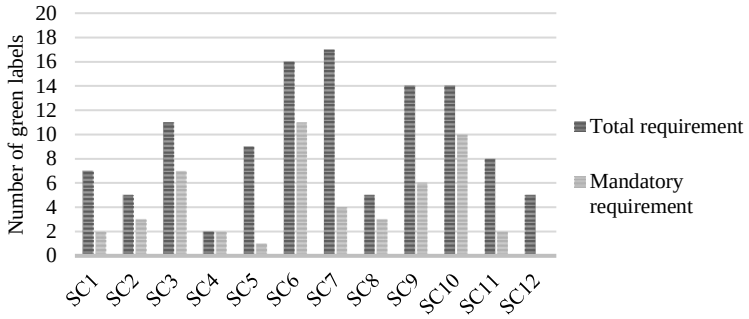

Fig. 4. Total and mandatory sub-categories of energy efficiency requirements in the analysed green labels.

Almost all the analysed green labels (17 out of 19) include renewable energy adoption (SC7), even though only 4 labels consider it as a mandatory requirement for the achievement of the certification. Efficient lighting systems (SC6), energy management (SC9) and energy monitoring and audit (SC10) are largely present in more than 75% of the analysed green labels. These measures are appealing, since they represent low-cost interventions able to provide high energy and economic savings in the short-term. The benefits they can provide, coupled with the possibility of their implementation without interrupting the usual operations of hotels, make them the most recurrent minimum requirements. Measures on glazed envelope (SC2), domestic hot water (SC4) and wellness centre equipment (SC12), despite their relevance on energy consumptions, are the least common sub-categories. SC12 is also the only voice with no compulsory requirements in any of the analysed labels. Finally, CO_2 reduction (SC11) is considered in 40% of the green labels, but only 10% of them uses it as a minimum requirement. This result appears conflicting with the international attention nowadays devoted to the reduction of the emissions caused by the building sector. To cope with this, the relevance of this sub-category should grow and include limit values of CO_2 emissions as minimum requirements for achieving the certification.

5 Conclusions

The paper develops a comparative analysis of 19 hotel-related green labels, aiming to investigate their ability to inform about the energy performance of accommodation structures. The comparison highlighted that energy efficiency is the most quoted category, with the heaviest impact on the total score. However, the most stimulating outcome lies in the critical aspects that the research brings to evidence. The review highlighted the impossibility to directly compare the environmental performance of hotels based on their green labels scores. Indeed, although they include the EE category, not all the schemes are equally detailed and common requirements are missing. Moreover, since green labels do not provide numerical results expressing the effective energy/carbon savings of an accommodation, it is difficult to compare the hotels in order to evaluate the greener ones. This information gap represents an interesting challenge for future investigations. As starting point for more informed and sound green certification schemes, intended as effective tools towards a low carbon society, green labels should provide transparent information, give major importance to the reduction of energy consumption and CO_2 emissions and define minimum compulsory requirements. A standardization procedure is necessary, in order to avoid the "green washing" phenomenon for consumers, and communication and education campaigns are also desirable, to effectively inform consumers and hoteliers on the huge potential that correctly-implemented green labels could have in the needed greening process of the lodging industry.

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