

Tools for benchmarking and recognizing hotels' green effort – environmental assessment methods and eco-labels

辨别酒店环保成就的基准：环保评估方法和标签

JENNIFER Y.LO

WILCO CHAN

CAROL X. ZHANG

Due to the increasing attention on green hotels, this paper aims to investigate environmental assessment methods (EAMs) and eco-labels in China. In this study, three EAMs for the evaluation of hotel environmental performance are included: Green Globe 21 Certification, Hotel Building Environmental Assessment Scheme and Green Hotel Certification are chosen for reviewing and benchmarking. General features are compared, then key issues are categorised, dissected and analysed. These major issues include energy, water, waste, building systems, design, environmental quality, emissions, health and safety management. The results show that these assessments lack uniformity. In addition, results indicate that benefits from EAMs are uncertain. Queries on the weight and credit formulation are also raised. The study also implies that there is a need to create comprehensive guidelines for hotel operators to select the most suitable assessments for their hotels.

KEYWORDS. Hotel, environmental assessment, eco-label, environmental performance

基于环保酒店的不断崛起，此文以研究中国环保评估方法（EAMs）和标签为目的。在此文中，三个EAMs被纳入研究范围：

绿色环保21，酒店的建筑环境评估方案，环保酒店认证。它们的共同点被比较从而关键问题被得出和分析。这些关键问题包含，能源，水，废弃物，建筑系统，设计，环境质量，排放，健康和安全管理。结果表明这些基准缺乏统一性。此外，结果表明获得EAM的直接益处尚不明显。同时权重和评价方程也不明晰。此研究表明需要创建一个全面广泛的指导方针来知道酒店管理者选择最适合的环保基准。

关键词：酒店，环保评估，环保标签，环保成效

Jennifer Y. Lo is Teaching Fellow of School of Hotel and Tourism Management, The Hong Kong Polytechnic University, Kowloon, Hong Kong(E-mail: jenniferloyuk@gmail.com).

Wilco Chan is Associate Professor of School of Hotel and Tourism Management at The Hong Kong Polytechnic University, Kowloon, Hong Kong(E-mail: Hong Kong, hmwilco@polyu.edu.hk).

Carol X. Zhang is a PhD Student of School of Hospitality and Tourism Management, University of Surrey, Guildford, United Kingdom(E-mail: carol.zhang@surrey.ac.uk).

Introduction

For the last few decades, environmental issues have become extremely important for human beings (Roberts, 1996). The increase of environmental awareness and concerns from customers leads to huge changes in their buying behaviours; customers are more willing to pay for environmentally friendly products and prefer eco-friendly companies. Therefore, green concerns have brought modifications in various business sectors (Roberts, 1996, D'Souza and Taghian, 2005).

Environmental awareness is gaining momentum in the lodging industry throughout the world. From another perspective, the lodging industry has negative impact on the environment through the construction of buildings, waste disposal and water usage (Mensah, 2006). According to UNWTO (2007), the hotel industry contributes to 21% of CO₂ emissions. Nevertheless, the hotel industry is highly dependent on an attractive and safe environment as a part of their core product (Chan and Wong, 2006). As customers care increasingly about the environment, they are more willing to make eco-friendly decisions on hotel selections (Han, Hsu, & Sheu, 2010). This is evidenced by the result of a survey in which nearly 90% of British tourists said that they consider it part of a hotel's responsibility to actively protect and support the environment (IHEI Research, 2002). This survey also indicates that British tourists are more willing to stay in those hotels which actively protect and support the environment.

Therefore, hotels have positively started to adopt environmental practices. Such greening efforts not only contribute to meeting demand but also lower the operation costs by reducing waste and energy consumption (Manaktola and Jauhari, 2007). This green image is also significantly helping hotels to increase their profits and to enhance their competitive advantages in the competitive lodging market (Chan & Wong, 2006).

An increasing number of hoteliers have recognized the importance of environmentally responsible actions. They have started establishing an environmental management system, implementing green practice and realizing the consequent benefits. However, hoteliers can hardly find an objective or systematic approach to measure the effectiveness and efficiency of their green actions (Font & Wood, 2007; Kasim, 2009).

As a consequence, various assessment methods have been introduced to evaluate and benchmark the environmental performance of hotels, such as the *Hotel Building Environmental Assessment Scheme* (HBEAS), *Green Globe 21*, *ECOTEL* and so on. Collectively they are called "environmental assessment methods" (EAMs), which share the same core notion – providing operational guidelines and assessment criteria for hotel managers with respect to environmental issues. Once a hotel succeeds in an assessment, a logo, called an "eco-label", will be awarded to the hotel.

While the internationally recognized ISO14001 standards have been popularly adopted by many large enterprises and listed companies, it can be seen that the penetration of this particular certification in the hotel sector has been slow. It is mainly because the standard itself is a generic framework by nature and there is a lack

of specific criteria directly relevant to hotels. The elements in the ISO 14001 process framework are confined to environmental policy, planning, implementation and operation, checking and connective action and management review plus continual improvement (Chan, 1997). Nevertheless, the three EAMs in the investigation possess these relevant criteria.

Under the various backgrounds of the certification bodies, different methods may have distinct focuses, and this may cause confusion among hoteliers and tourists. Therefore, a comparison of these assessment schemes and their associated eco-labels has been carried out. The main objectives of this study are:

1. Introducing the general features of various EAMs and eco-labels for hotels in China;
2. Comparing and contrasting the key issues covered; and
3. Discussing future directions for EAMs and eco-labels applying to hotels in China.

Despite the fact that most of the existing EAMs and eco-labels are being used in Europe and North America, this study focuses on those used by hotels particularly in China since the lodging industry has grown rapidly following the expansion of the economy and tourism in recent years. The United Nations World Tourism Organization (UNWTO) has predicted that China will become the leading nation in receiving international tourists with an estimated number of international visitors approaching 130 million by 2020 (UNWTO, 2002). In addition to the fast growth in China, Swarbrooke and Horner (1999) suggest that there is a relationship between nationality and environmental concerns. Thus, eco-labels should be tailor-made based on the characteristics of a particular nation. Compared to the developed world, environmental management is relatively new to China. Studies have found out that in developing countries the knowledge and skills of environmental management need to be improved (WTTC, 2009; Kasim, 2009).

From another perspective, some energy and water related areas, green purchase, hotel green design and building services systems are less addressed in the environmental assessment exercises of local hotels. Teng, Horng, Hu, Chien and Shen, (2012) evaluated eight environmental assessment tools for hotels industry in Taiwan to create an instrument to help address climate change. In their study, they find that there are various indicators for different programmes and they believe that there is a need to refine the core components to support the transformational changes needed in the hotel industry. To address these issues, this study develops in-depth evaluations of three environmental management tools in the hotel industry in China.

Environmental Assessment and Eco

As pointed out by Walley and Whitehead (1994), today's managers lack a framework that could allow them to make their good environmental intentions a reality. Surprisingly, this is still an issue today, especially for hoteliers in Asia (Kasim, 2009; Tang et al., 2012). The need to account for the potential ecological impact of different investments and for monitoring the environmental impact of ongoing activities gives rise to the use of environmental assessment tools. These assessment tools would allow

proper and objective measurements of a firm's environmental performance (Tyteca, 1996).

According to Lee et al. (2002), an Environmental Assessment Method (EAM) is a voluntary initiative, which provides information on environmental issues likely to be encountered by an organization. EAMs are not laws, but rather accreditations that could encourage green practice through awarding credits or points for various assessed criteria.

The assessment process can be done by self-declaration and certification by independent agents or by the government (Lee, Chau, Yik, Burnett, & Tse, 2002). It is usually conducted by benchmarking against a set of prescribed performance indicators of diverse objectives. These include quantitative (such as energy input) and qualitative (such as use of sustainable raw materials) indicators. These indicators are beneficial and achievable by a proportion of the industry (Font and Harris, 2004). The total score awarded is the aggregation of the total number of credits obtained, and this will be categorized into one of the pre-set performance grade levels. If the hotel applicant achieves the required level, the hotel will be awarded an eco-label. Based on the reinforcement principle of animal learning behaviour psychology, eco-labels can be viewed as a reward mechanism for enterprises who achieve better results than those who just meet the minimum environmental performance required by law (Pol, 2002). *Blue Angel* in Germany (Blauen, 2012), *Energy Star* in the United States (Energy Star, 2012), *EU Eco-label* in Europe (Philip, 1998) and the *ISO 14000 certification* (ISO, 2002) are some of the examples of eco-labels.

Eco-labels for manufactured products were first introduced in the late 1980s as a result of the increasing public awareness of environmental issues (Chau, Lee, Yik, & Burnett, 2000). The EU eco-label award scheme, for instance, is one of the most popular in Europe. It is designed to identify products with reduced adverse environmental impact (OECD, 1999). Due to the increasing attention on environmental issues, eco-labels have rapidly become an established part of the marketplace since then (Lathrop and Centner, 1998).

Eco-labels have been widely used mainly because of their benefits in attracting customers, cutting costs and improving the environmental image of the business. Thus, it can be claimed that eco-labels are an efficient marketing tool. However, Font and Wood (2007) argue that certification of sustainable tourism has insufficient evidence to prove their guaranteed benefits; the marketing benefits of eco-labels remain unknown.

Furthermore, one of the most important benefits to motivate hoteliers to obtain an eco-label is the increase of green demand since the logo is seen to add value to the company or product (Font, 2002; Toth, 2002). Manufacturers have been encouraged to design products with less environmental impact. In other words, these labels influence production and consumption patterns (UNWTO, 2002).

However, consumers are facing limitations with regard to turning their pro-environmental attitudes into eco-friendly actions. Studies show that only a small portion of environmentally conscious customers actually purchase eco-friendly products in the marketplace (Roberts, 1996), because consumers may want to be

environmentally responsible but still want to maintain their existing lifestyle (McDaniel and Rylander, 1993); they may not be prepared to sacrifice convenience (Stem, 1999). Moreover, monetary cost is very important to consumers. There is an ongoing perception that green products are too expensive. Price along with quality and convenience continue to be more salient factors in consumer decision making than the relative greenness of the product (Ottman, 1992). Furthermore, research on European hotels found that inaction reflected a perceived lack of demand for environmental improvements, leading to a lack of concern on balancing the relationship between price and demand for eco-friendly products, which is a reminder of importance of raising both operators' and customers' awareness in order for action to occur (Bohdanowicz, 2005). Watkins (1994) probed tourists' (US travellers) attitudes towards knowledge of environmentally sensitive accommodation. 70% of respondents indicated that they were likely or extremely likely to stay in a hotel that adopts policies to protect the environment. However, few were willing to pay higher room rates. Moreover, most of them did not believe their efforts would help the environment. Therefore, Watkins concludes that an environmentally conscious consumer is not necessarily an eco-friendly traveller. Similarly, studies illustrate that increasing environmental awareness has not been transferred to environmental behaviours (Wearing, Cynn, Ponting, & Matthew, 2002; Dawson, Stewart, Harvety, & Scott, 2010).

Furthermore, most research assumes that hotels start to adopt environmental management systems because of the well expressed benefits. Recent research has shown a different perspective. The organizational environmental values seem to be a significant factor for pro-environmental behaviours of marketers (El Dief & Font, 2010). Chan and Wong's (2006) research on hoteliers' motivations for obtaining an eco-label show that corporate governance is listed as the top motivator. This benefit clearly has higher priority compared to other benefits related to eco-labels and customers' demand. In the Asian hotel industry, the concept of green hotels is relatively new compared to that of the developed world. Limited research has been focused on this specific region. Kasim (2009), for example, demonstrates that Asia's hotel managers lack common knowledge of environmental management.

Since the 1980s, similar kinds of environmental assessments and eco-labels have been introduced into the hospitality and tourism industry. At that time, nearly all of the EAMs and eco-labels were developed and applied in Europe (UNWTO, 2002). Today, there are approximately 60 hotel eco-labels worldwide. They vary considerably with regard to aspects such as geographic scale, tourism subsectors covered, key issues addressed, restrictiveness, certification format, transparency, audit process and so on. Yet, most of these EAMs and eco-labels are very specialized, and few have prospered, according to Buckley (2002). Their effects in general have not been strong thus far, but are expected to become powerful soon in such an information-centred era.

Prior study indicates that the motivations of hoteliers for establishing EAMS and obtaining eco-labels are to fulfil legal requirements and to be in line with corporate governance (Chan and Wong, 2006). Such results can probably be attributed to the

upper management's focus on improving customer services and revenue, rather than environmental actions. Chan (2008) further adds that the barriers hindering hotel setting up EAMS are a result of the lack of knowledge and skills, professional advice, uncertainty of outcome, resource and maintenance cost. These findings imply that actions to eliminate these obstacles are needed. Hence, a more clear, detailed, comprehensive and industry-specific environmental assessment method urgently needs to be established for the environmental movement in China to advance.

Method

Currently, there are 113 eco-labels in Asia (Ecolabel Index, 2012), but few eco-labels focus on the hotel industry. Since this study targets EAMs and their associated eco-labels for hotels in China, the first step is to identify the relevant schemes currently available. The following are the most popular EAMs in China:

1. Green Globe 21 Certification (GG21)
2. Hotel Building Environmental Assessment Scheme (HBEAS)
3. Green Hotel Certification (GH)

For Green Globe, its business objective aims to provide customized environmental programmes including small-and-medium enterprise (SME). The inclusion of Green Globe assessment in the investigation meets the needs of many SME lodging units. HBEAS is developed by building professionals. The criteria in its assessment are derived from engineering and empirical study in high-rise and deluxe hotel buildings. Since many environmental parameters in hotels are related to engineering and most new hotels in China are also high-rise, this investigation opts for HBEAS as an object of study. Green Hotel certification has been administered by the government commercial bureau, as China is a centrally planning nation and the government has tight control over enterprises including hotels. To maintain a smooth interaction with the commercial bureau, many hotel operators give more weight to the environmental schemes or measures initiated by the bureau. Therefore, the comparisons between these three eco-labels will benefit the environmental management of hotels in China.

The general features of these three EAMs are sought from their respective portals. Qualitative data analysis is then applied. The analysis involves three aspects: data reduction, data display, and drawing conclusions (Miles and Huberman, 1994). This study attempts to identify categories, themes, and concepts emerging from the data. Next, the method of content analysis (Neuendorf, 2002) is used to process the collected secondary data. Generally, content analysis is a basic research tool that is usually applied to various non-statistical materials and allows people to analyze such materials in a systematic and objective way (Finn, Elliott-White, & Walton, 2000). Similarly, Patton (1987) describes content analysis as dividing data into "coherent categories, patterns, and themes" through the process of labelling. Krippendorff (2008) tends to define content analysis from a qualitative perspective, believing that data is often objective in nature. Krippendorff (2008) proposes a content analysis framework in figure 1.

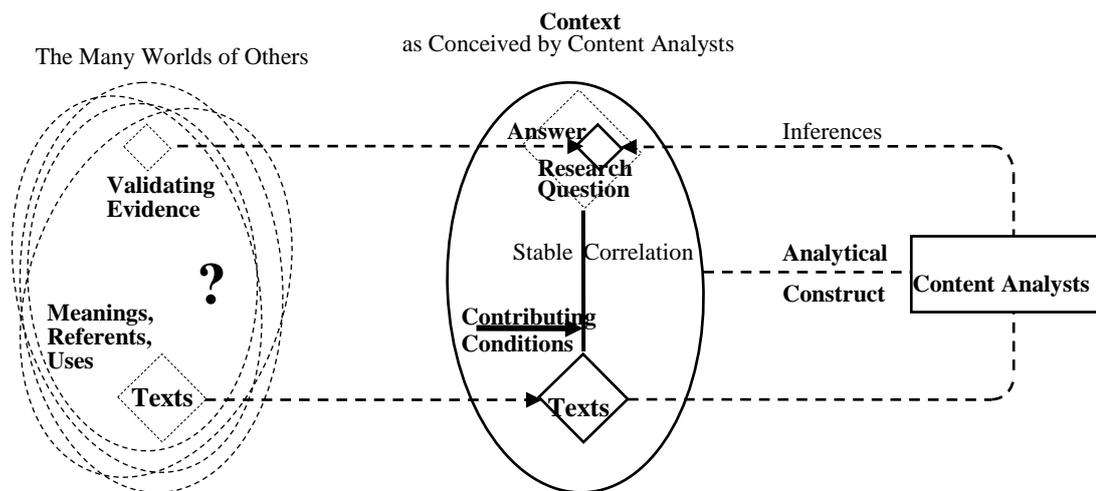


Figure 1. A Framework for Content Analysis (Krippendorff, 2008).

This study adopts Krippendorff's (2008) framework for content analysis for the three EAMs. The framework begins with data and research questions. This analytical construct can help to reveal how available texts are connected to the possible answers to research questions and the conditions under which these correlations may change. This ensures that the texts are always in line with the main goals of the study. Moreover, conflicting inferences are taken through the process of coding, where themes and categories are developed.

To systematically analyze their content, the investigation consults categorical issues being raised by the International Hotel Association (IHEI, 1996) and the analytical framework used by prior study (Chan, 2009). The issues of energy, water, solid waste and green purchase used by the former study are also used in this analysis, while the following issues are added: general building systems, hotel design, and safety. In addition, the issue about environmental qualities is separated as indoor and outdoor pollution. After data reduction, the researchers divide the collected information into several organized subcategories based on the research objectives, and consequently draw conclusions by inductive reasoning (Lincoln and Guba, 1986) and comparative methods (Martin and Turner, 1986). This induction approach allows the investigators to maintain an open mind in ascertaining new elements or concepts in the data which have not been documented. Venn diagrams are used to show the taxonomy and overlapping among the three methods.

General Features

The general features of each assessment method are summarized in Table 1.

Green Globe 21 Certification. Green Globe 21 Certification (GG21) is claimed to be the only global benchmarking programme for travel and tourism organizations of varying types and sizes (Green Globe, 2006), which distinguishes it from the other two EAMs.

It was established in 1994 by the World Tourism and Travel Council (WTTC). The scheme aims to turn the principles of Agenda 21 into practical actions for tourism-related organizations around the world (Green Globe, 2011). The core indicators are developed by the Sustainable Tourism Cooperative Research Centre. The assessment process is uniquely facilitated by a computer program called “Earthcheck™”. After inputting relevant operation activity measures by the applicant (such as number of occupied rooms per night of a hotel, or use of environmentally friendly detergent in laundry, etc.), the program will automatically produce a rating report on all “Earthcheck™” indicators. As GG21 is a globally recognized brand in the tourism industry, many firms have actively sought this certificate not only to enjoy the benefits of its ongoing environmental measurements, but also to market the company to the global market. As of 2011, there are 167 hotels worldwide certified by GG21 (Green Globe, 2011a). With the international reputation of GG21, it seems that GG21 contains the most common components of environmental management assessment criteria worldwide.

Hotel Building Environmental Assessment Scheme. Initiated by the Hong Kong Hotels Association, the Hotel Building Environmental Assessment Scheme (HBEAS) aims at promoting eco-friendly management and operation practices for hotels (HBEAS, 2000). Specifically, it encourages the reduction of natural resources consumption, waste and effluents. In addition, it aims to maintain a comfortable, healthy and productive indoor environment. The assessment framework is clearly divided into two sections: 1. environmental management, operations and maintenance practices (32 criteria); and 2. facilities and building performance (50 criteria). The former considers the actions of a hotel in endeavouring to reduce environmental impact through effective operating practices, i.e. the software. The latter looks at the hardware of a hotel, such as the building services systems, energy input and output, etc. The scores of the two sections are rated separately, which is different from other EAMs in the study. There is no record for its users.

Green Hotel Certification. The *Green Hotel Certification* (GH) was developed by the Central Government of the People’s Republic of China (PRC) in 2001. It was initiated by the state’s Ministry of Commerce, National Development and Reform Commission, State-owned Assets Supervision and Administration Commission of State Council, State Environmental Protection Administration, National Tourism Administration, and Standardization Administration. This national standard has incorporated several commercial and provincial standards. Five grading levels are available, represented by the ginkgo leaf logo. The better the performance of a hotel, the more leaves it can obtain. Currently, 42 hotels have been awarded this eco-label in China (China Hotel Association, 2011). Among these hotels, most are luxury hotels. In the study of Teng et al. (2012), this certificate is included in the comparison of 7 other international certificates for hotels in Taiwan. It is apparent that GH does not address issues like social involvement and communication. However, this evaluation remains on a basic

level which only compares the key components of GH, and as such the 2012 evaluation may overlook the unique point of GH in China.

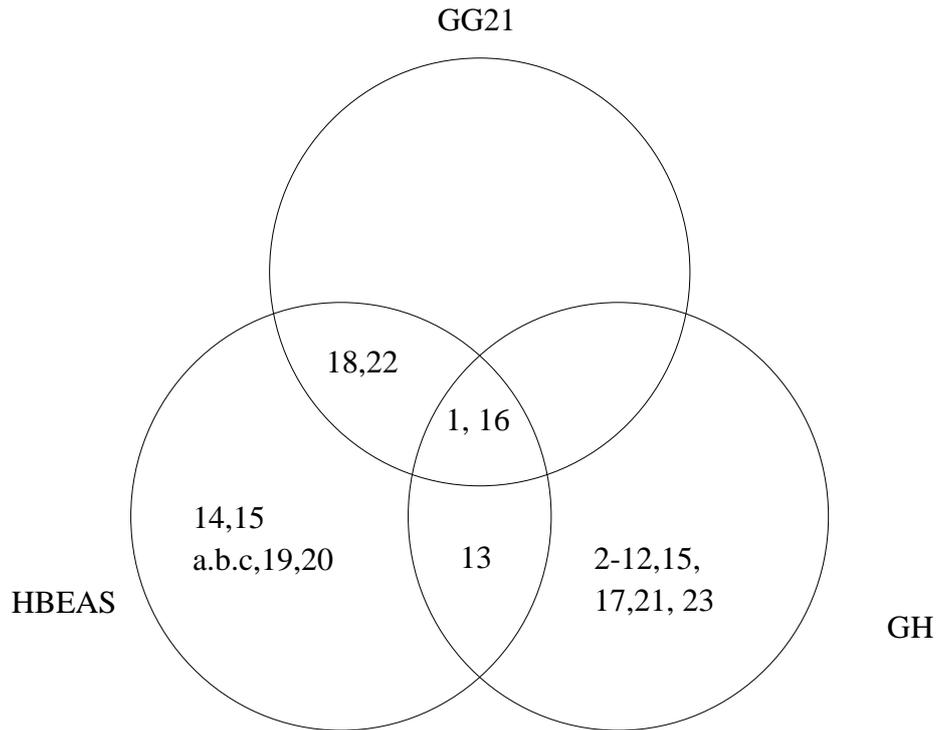
Table 1. General Features of Green Globe 21 Certification, Hotel Building Environmental Assessment Scheme and Green Hotel Certification.

	GG21	HBEAS	GH		
Development					
Initiation Year	1994	2000	2002		
Initiator	World Travel and Tourism Council (WTTC)	Hong Kong Hotel Association (HKHA)	People's Republic of China Government (PRC)		
Objective / Aim	1. To raise environmental awareness and promote good practice in the global hospitality industry. 2. To promote the business benefits of sound environmental and socially responsible business practices. 3. To develop hotel-specific self-help guidance, enabling properties of all sizes to implement environmental programmes.	To reduce a building's environmental impact using the best available techniques and within manageable cost and available human resources.	To provide practical suggestions in developing green hotel, implementing and enhancing environmental management system in a hotel.		
Target Group	Tourism sector (including accommodation, tour operators, destinations, etc)	Accommodation sector	Accommodation sector		
Originality of Target Group	Global	Hong Kong	Mainland China		
Latest Version	Version 602 (Sector Benchmarking Indicators for Accommodation)	Version 1/00	GB/T-21084-2007		
Assessment					
Assessment Framework	1. Operation performance 2. Operation activities	1. Environmental management, operations and maintenance practices 2. Facilities and building performance	1. Basic requirement 2. Green design 3. Safety and management 4. Energy saving 5. Environmental protection 6. Healthy management 7. Green marketing		
Quantitative / Qualitative Criteria	Both	Both	Both		
Regular Update of Criteria	Yes	Yes	Yes		
Procedure					
Assessment Procedure	Independent assessment by Green Globe	1. Self-assessment 2. Independent certification by certified agency	Independent assessment by designated local agent		
Regularity of Audit	1 year	Not mentioned	2 year		
No. of Grading Level	Three: 1. A: Affiliates Introductory information support service 2. B: Benchmarking Suitable for triple bottom line reporting 3. C: Certification Full certification assessment		M	P	Five: One Leaf (160) Two Leaves (180) Three Leaves (210) Four Leaves (240) Five Leaves (270) Full points: 300
		Fair	11-15	18-24	
		Good	16-20	25-31	
		Very Good	21-25	32-37	
		Excellent	26+	38+	
		Under "Management" & "Performance" categories			
Length of Validity	Not mentioned	Not mentioned	4 years		
Penalty for Non-compliance	No	No	No		

Sources: HBEAS (2000), GG21(2011), China Hotel Association (2011)

Both the indicators and the scoring structures of the three EAMs are significantly different. For GG21, there are only 8 indicators with equal weighting. The indicators are simple without much explanation. In HBEAS, there are 25 unevenly weighted criteria, which add up to a maximum of 82 scores. For GH, there are 45 key criteria. The indicators are also unevenly weighted, and the score is capped at 300. In addition, there are 12 prerequisite criteria in GH under general issues. These prerequisite criteria must be accomplished before proceeding further. Unlike GH, HBEAS and GG21 do not include any prerequisite criteria.

The three methods show an extremely varied distribution of scores over various key environmental issues. Details of scoring in each factor listed in Appendix 1.



General issues

1. Environmental policy and system
2. Green target
3. Informing and raising awareness
4. Environmental team or representative
5. Set up internal Environmental fund
6. Environmental Guarantee
7. Environmental audit and reward
8. Environmental Training
9. Compliance to environmental regulations
10. Free from environmental pollution
11. Free from fire safety and food safety
12. Systematic green management program

Energy-related issues

13. Energy management and conservation
14. Energy management system
15. Operation efficiency of major energy-consuming systems
 - a. Air-conditioning installations
 - b. Lighting installations
 - c. Electrical installations
16. Energy consumption
17. Application of new energy-saving technology

Water-related issues

18. Water consumption
19. Water conservation
20. Water conservation equipment
21. Waste water discharge

Solid waste-related issues

22. Waste management
23. Solid waste collection

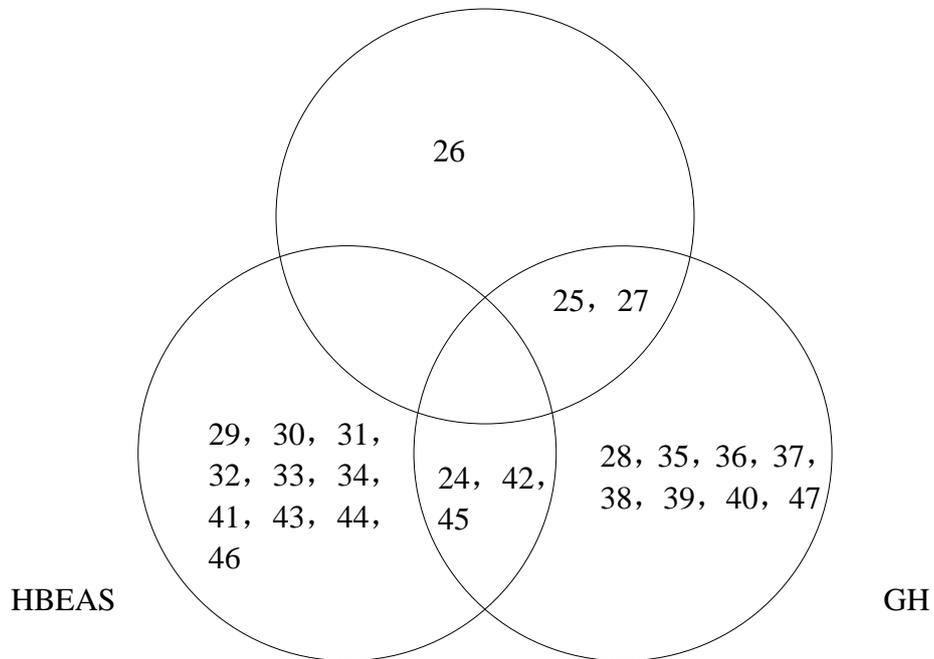
Figure 2. Comparative Analysis based on General, Energy, Water and Solid Waste.

Figure 2 shows the classified findings of the following issues being considered by the three studied methods: general, energy, water and solid waste. From the figure above, it is noticeable that environmental policy and system is a necessary factor for these three schemes to begin with. In GH, there are obviously more issues relating to general issues compared with GG21 and HBEAS. However, these factors are mostly related to prerequisites (1-11) that do not carry any score, excepting the systematic green management programme, which account for 6 in the GH assessment system.

Another important element pertaining to energy-related issues is energy consumption, which is one of the well-expressed benefits that EAMs could bring to hotels. It is observed that HBEAS puts a heavy weighting on energy-related issues. A maximum score of 28 can be attained in this area, which accounts for around 34% of the total score in the scheme. For GH, 51 points (i.e. 17%) are allocated for energy-related issues. GH involves different items under operation efficiency of major energy consuming systems such as air conditioning, electricity, gas and other related issues. For GG21, on the other hand, only 1 indicator is used to evaluate energy consumption by hotels.

All of these three schemes have similar emphasis on water-related issues and solid waste-related issues. For GH, waste water discharge is considered as an indicator to reflect the issue of water. It is also noted that solid waste collection is viewed as a solid waste-related issue under both GG21 and HBEAS.

GG21



Green purchase

- 24. Product purchase
- 25. Pesticides, herbicides and fertilizers
- 26. Paper products
- 27. Cleaning products and process
- 28. Regular meeting with supplier

Building and building services systems

- 29. Building maintenance
- 30. Operation and maintenance of building services systems
- 31. Mineral fibers
- 32. Radon
- 33. Facilities for servicing building
- 34. Metering and monitoring equipment
- 35. Water purification system for swimming pool
- 36. Cooling tower

Hotel design

- 37. Hotel environment design
- 38. Building design
- 39. Workflow design
- 40. Garden design

Indoor environmental quality

- 41. Thermal comfort conditions
- 42. Indoor air quality
- 43. Interior lighting
- 44. Indoor noise

Pollution and emissions

- 45. Noise emissions
- 46. Ozone layer
- 47. Discharge from boiler

Figure 3. Comparative analysis based on issues of purchasing, system, design, environmental quality and emission.

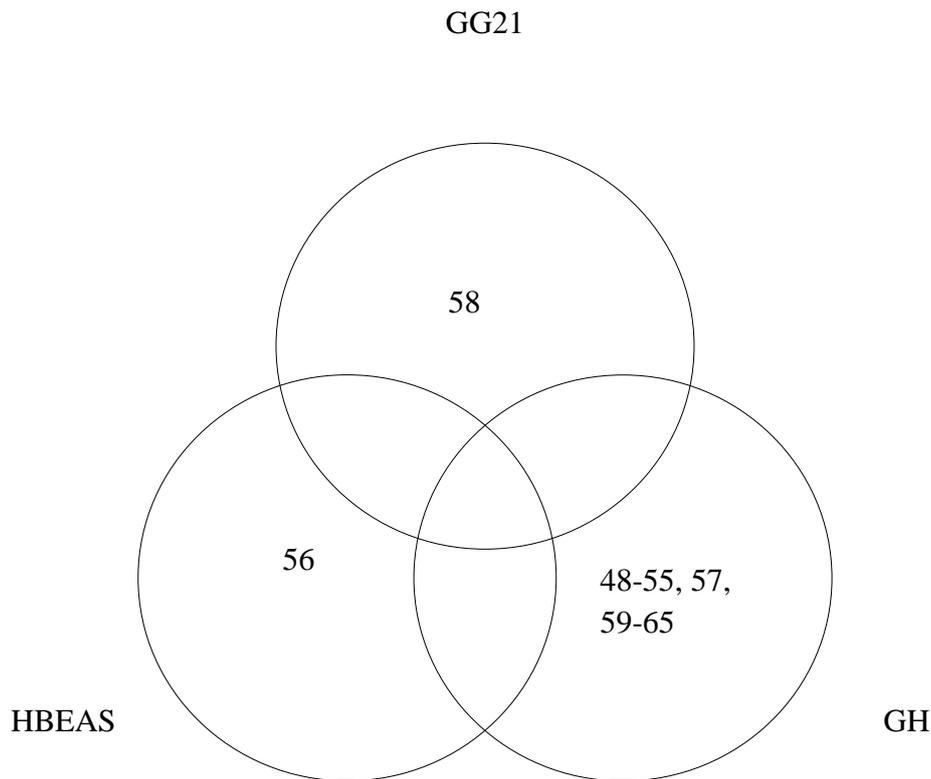
As can be seen from Figure 3 above, while GH adopts 4 assessing elements under the category of green purchase, GH's weighted points are relatively small, accounting for 3.6% of total points. It is also noted that only GH regards regular meeting with supplier as an indicator. GG21, meanwhile, includes paper products in the assessment. In addition, 3 out of the 8 indicators are put under the category of green purchasing. The materials concerned include pesticides, paper and cleaning products. This shows that green purchasing is important in obtaining GG21 certification.

Due to the fact that HBEAS is developed and prepared by the Department of Building Services Engineering of the Hong Kong Polytechnic University, a large proportion of points (15 points; 18%) are put under the category of building and building services systems. However, only 1.3% (4 points) of the total score is related to building and building services systems in GH. There is no indicator in this category at all in GG21.

Among the three environmental assessment schemes, only GH includes indicators regarding the design of a hotel's total environment, including the building and garden, as well as the workflow. A maximum of 47 points (16%) can be obtained. Yet, it is interesting to discover that GG21 and HBEAS do not touch this category.

Similar to the situation in building and building services systems, the category of indoor environmental quality is prominent in HBEAS, accounting for 13 points (16%), compared to only 5 points (1.7%) and 0 points in GH and GG21 respectively.

For pollution and emission, both HBEAS and GH include the indicator of noise emission. HBEAS contains Ozone layer and GH contains boiler discharge. There is no such indicator under GG21.



Safety and Health Management

- 48. Installation of fire protection facilities
- 49. Installation of CCTV system
- 50. Installation of smoke detection and alarming device
- 51. Contingency plan for fire and food safety
- 52. Assurance of safety environment
- 53. Regular training for staff on fire and food safety
- 54. Green guest room
- 55. Green restaurant
- 56. Biological contamination

Other issues

- 57. Application of innovative green technology
- 58. Community commitment
- 59. Involvement in social welfare/environmental protection activities
- 60. Receipt of positive comment from public
- 61. Special offer to green consumer
- 62. Guest satisfaction on hotel environment
- 63. High occupancy rate of green guest room
- 64. Award from government
- 65. Staff training

Figure 4. Comparative analysis based on issues of safety and health management and other issues.

Safety and health management is the most heavily weighted category in GH. The maximum attainable score is 132, which represents 44% of the total score. In particular, green guest rooms (53 points) and green restaurants (56 points) carry most of the points. On the other hand, a very different score allocation is observed in HBEAS and GG21 for safety and health management criteria. Only 3 points are assigned under this category in HBEAS, specifically for biological contamination, and no score at all in GG21.

Finally, it is demonstrated that unlike the other two EAMs, GH puts certain points on social indicators. These include indicators like staff training, government awards, positive comment from the public, and so on. Some innovative social indicators are used, such as staff involvement in social welfare activities, and special offers or discounts to green consumers. GG21 also incorporates an indicator reflecting the hotel's community commitment. However, no social indicators are included in HBEAS's assessment.

Discussion

It could be argued that energy and policy are the two main focuses of green labels in this region, because "energy consumption" and "environmental policy and systems" are common to GG21, GH and HBEAS. Furthermore, it confirms that the reduction of energy consumption is the major benefit that hoteliers are looking for (Manaktola and Jauhari, 2007). Policies play an important role in environmental assessment management. However, overemphasis on policies may indicate restrictions and therefore discourage hoteliers' attempts to acquire eco-labels.

Nevertheless, findings from this study reveal the dissimilarity of different EAMs' structure and score allocation; a generally agreed format of EAMs is lacking. Similarly, Buckley (2002) illustrates that existing tourism certification programmes are uncoordinated and commonplace. Tyle (2002) also points out that the development of numerous assessments and eco-labels with various focuses have generated confusion as to the validity of these programmes. Thus far, there is no consensus on the assessment structure and the relative importance of different environmental issues in EAMs (Bisset, 1980; BRE, 1993; Cole, 1998; Levin, 1997; Wehrmeyer and Tyteca, 1998; Priego & Palacios, 2008). The objectivity of the weight assignment in different EAMs is always subject to question (Chau et al., 2000). For Wehrmeyer (1993), "*Science has not yet come forward with a universally accepted and absolute measure of how to compare and evaluate different environmental impact*".

In this study, the background of the developers is probably a cause for the differences in score allocation. For instance, HBEAS is mainly drafted and prepared by a group of scholars with engineering backgrounds. Thus the scheme puts more emphasis on engineering aspects. In other words, it focuses on the hardware including the hotel building and facilities. In contrast, GG21 and GH are not produced by engineers. Thus the focus lay on the operation and management issues, i.e. software. This also implies that the various parties related to hotel environmental management need to work together in developing EAMs.

The difference in geographical coverage of the EAMs also matters in EAM structure. GG21 is a global certification which provides general guidelines. On the other hand, GH and HBEAS are national and local standards respectively. They are more geographically specific in nature. Therefore the criteria in these two EAMs are more specific than GG21, with national or local laws and regulations as the basis for baseline performance standards. Both GH and HBEAS incorporate local practice, reflecting the special needs of the country or city. Undoubtedly, variations in

assessment structure and score allocation will cause confusion for hoteliers and tourists. Moreover, GH only has the simplified Chinese version, and as such may create confusion for hoteliers or tourists who are not familiar with the simplified Chinese.

Therefore it is necessary to have a “*universally accepted*” EAM or eco-label. In fact, different EAMs place emphasis on different issues, due to the dissimilarities of the originating country’s situation (such as climate, pollution problems, utility cost, etc.) and the originator’s background (such as civil engineering, accounting, environmental engineering, etc.). Burnett et al. (2005) use the example that potable water is deemed one of the scarce resources of this century, but it tends to receive relatively little weight in most EAMs. On the other hand, a survey discovered that people in Hong Kong ranked the indoor air quality and indoor noise as the two most important issues in EAMs for buildings (Chau et al., 2002). A possible reason could be that Hong Kong people on average spend more than 85% of their time indoors (Chau et al., 2002). It is obvious that people would pay more attention to those aspects that relate directly to them. Therefore it is more important to consider the geographical, political, socio-economic and sectoral conditions prevailing in each country (UNWTO, 2003) as well as knowledge of local design, operations and maintenance practices (Yik, Burnett, & Prescott, 2001) when developing an EAM.

Nevertheless, a comprehensive EAM provides detailed information of environmental concerns for hotel operators or interested parties. In particular, those hotels which are new to EAMs and plan to acquire more information of available EAMs would find a comprehensive EAM a useful reference. Consequently, it is worth developing such an EAM by creating a synergy of these three assessment methods or even more.

Apart from lack of uniformity, current EAMs and eco-labels have other shortcomings. The uncertain economic benefit is one of these shortcomings. For a successful voluntary EAM, it is necessary to ensure the attractiveness and cost-effectiveness of the point scale of the rating system. However, most assessment methods tend to focus on establishing credibility but fail to address the economic concerns of most investors (Chau et al., 2000). It is pointed out that the current EAMs do not help investors and designers to reveal the actual resources required for meeting various assessed criteria (Lee et al., 2002). In other words, the incremental costs and benefits associated with each credit are unknown. This economic consideration is especially imperative as firms would only invest in specific environmental strategies that have paybacks within an economically viable timeframe (Walley & Whitehead, 1994). In this regard, environmental costing studies should be promoted so as to generate useful economic information for quantifying the impact of credit. Earlier and recent research about environmental costing could serve as a reference for developing economic links to these credits in EAMs (Chan, 2005; Chan and Wong, 2008; Chan et al., 2009).

Furthermore, benefits from attaining the certificate have been challenged by the gaps between attitudes and behaviour as well as the emergence of green washing (Wearing et al., 2002; Bohdanowicz, 2005). There are still many challenges for EAMs

to face including convincing customers to actually take action. With the unknown market demand, the effectiveness of these EAMs becomes unknown. In addition, these EAMs generally lack factors related to customers' perspectives. Given that customers are one of the key motivators for gaining EAMs (Roberts, 1996, D'Souza & Taghian, 2005), evaluations solely from the supply side may fail to address the initial objectives of all EAMs.

In addition, there is inadequate guidance for investors to prioritize the measures in an EAM (Cole, 1998; Finch, 1992; Levin, 1997). Yik, Burnett and Prescott (2001) point out that there is an "*inherent trade-off between assessment criteria*". For example, hotel developers and operators would try to achieve higher scores for reduced energy consumption at the expenses of worse indoor environmental quality by lowering ventilation rates. If insufficient guidance is offered, the developers cannot determine their priorities, and this may deter their participation in the voluntary assessment. However, the scoring systems in most current EAMs are too complex for investors. Thus, it is not easy for investors to judge the value of any additional investment in improving the assessment outcomes (Burnett et al., 2005).

Last but not least, insufficient information about existing EAMs is readily available to the public. Tourists may pay little attention to those green labels unless the details are made explicit. Therefore it is strongly recommended that the certification agent should clearly communicate the details of criteria, assessment and audit procedures, grading levels, and effectiveness of the assessment to hoteliers and consumers. With the aid of sufficient information, tourists can make their own judgment on the significance, reliability and usefulness of various eco-labels (Buckley, 2002). Only those EAMs and eco-labels with quality or reliability will gain prosperity, while others will be phased out as expected.

Conclusion

Environmental protection and management is no longer only for the smokestack industries nowadays. The service sector has recognized its social responsibilities in this area too (ISO, 2005). The need to objectively evaluate and communicate the green performance of a hotel has given rise to hotel EAMs and eco-labels. This study represents the first of its kind in comparing and analyzing these three EAMs in the hotel sector. Although these assessments and eco-labels have little impact across the sector as a whole now, it is expected that they will reveal tremendous potential to help the industry to achieve sustainability (UNWTO, 2002).

Therefore, this paper compares and contrasts the key features of three EAMs and their associated eco-labels. Their focuses are very different, due to the dissimilarity in background of developer and geographical coverage. However, this paper does not merely intend to make comparisons among their key features. It aims to provide more useful, detailed information for hoteliers and tourists; hoteliers may use the information from this paper to select the most suitable assessment methods for their hotels, while tourists may use it to help choose between accommodation options.

Compared to countries in Europe or North America, Asian countries are lagging far behind in terms of environmental protection and management. On the other hand,

however, Asian countries possess greater potential for environmental advancement. The 2012 study of Teng et al. provides a valuable example. The study compares different international EAMs to develop a set of key components for Taiwanese hotels to better address the situation there. The study indicates that the Asian hotel industry, including hotels in China, has a great opportunity to develop EAMs with their local features. This is especially significant when UNWTO points out that many Asian tourism destinations, such as China, India and Thailand are emerging rapidly. It is to be hoped that effective application of EAMs and eco-labels, with the endorsement of local governments and regional organizations, can definitely reduce the environmental impact stemming from the lodging sector in China.

Limitation and Future Direction

This study also contains several limitations. Firstly, the study is based on work conducted on an unpaid basis. Thus, the study could not get access to some information which requires payment. Without this restriction, future studies could provide a more in-depth investigation. In addition, future research should make boarder comparisons to examine agreement across EAMs. One possible way is to make use of the global sustainable tourism criteria website that has compared various labels. In this study, three EAMs are compared from an environmental perspective for hotels in China only. Thus, sustainable perspectives are overlooked and possibly need to be enhanced in future research.

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Appendix: Summary of key issues covered

Key Issues Covered	<u>EAM</u>		
	GG21*	HBEAS	GH
General issues			
Environmental policy & system	√	√1	#
Green target			#
Informing and raising awareness			#
Environmental team or representative			#
Set up internal environmental fund			#
Environmental guarantee			#
Environmental audit & reward			#
Environmental training			#
Compliance to environmental regulations			#
Free from environmental pollution			#
Free from fire safety & food safety accident			#
Systematic green management program			√6
Energy-related issues			

Energy management & conservation		√4	√11
Energy management system		√4	
Operation efficiency of major energy-consuming systems	1. Air conditioning installations	√6	√25
	2. Lighting installations	√4	
	3. Electrical installations	√4	
Energy consumption	√	√6	√8
Application of new energy-saving technology			√7
Water-related issues			
Water consumption	√	√2	
Water conservation		√4	
Water conservation equipment		√3	
Waste water discharge			√4
Solid waste-related issues			
Waste management	√	√1	
Solid waste collection			√10
Green purchasing			
Product purchase		√5	√2

Pesticides, herbicides & fertilizers	√	√2
Paper products	√	
Cleaning products & process	√	√5
Regular meeting with supplier		√2

Building& building services systems

Building maintenance	√1	
Operation & maintenance of building services systems	√3	
Mineral fibres	√3	
Radon	√1	
Facilities for servicing building	√2	
Metering & monitoring equipment	√5	
Water purification system for swimming pool		√2
Cooling tower		√2

Hotel design

Hotel environment design		√6
Building design		√16
Workflow design		√14
Garden design		√11

Indoor environmental quality

Thermal comfort conditions	√3	
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Indoor air quality	√4	√5
Interior lighting	√3	
Indoor noise	√3	

Pollution & emissions

Noise emissions	√1	√4
Ozone layer	√6	
Discharge from boiler		√4

Safety & health management

Installation of fire protection facilities		√3
Installation of CCTV system		√3
Installation of smoke detection & alarming device		√3
Contingency plan for fire & food safety		√3
Assurance of safety environment		√7
Regular training for staff on fire & food safety		√4
Green guest room		√53
Green restaurant		√56
Biological contamination	√3	

Other issues

Application of innovative green		√2
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technology		
Community commitment	√	
Involvement in social welfare		√5
/environmental protection activities		
Receipt of positive comment from		√3
public		
Special offer to green consumer		√3
Guest satisfaction on hotel		√2
environment		
High occupancy rate of green guest		√2
room		
Award from government		√2
Staff training		√3

* -- Equal weightings are assigned to different environmental issues.

-- Prerequisite item that does not carry any score.

The number after “√” represents the maximum number of score attainable for that particular criterion.

Sources: HBEAS (2000), Green Globe (2011), China Hotel Association (2011)