

## **Towards an eco-efficient hotel industry**

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### **Abstract**

Tourism has experienced global expansion in the last sixty years and has become a major economic sector with constantly high growth rates. In parallel the environmental impact has grown significantly and the hotel industry faces increasing competition. Therefore environmental aspects of the operations and costs due to rising prices of energy and resources or inefficient technical devices and practices have become a focus in the hotel industry. Many labels and tools are available to address these problems. However, the implementation rate of improvements has been rather low until now. In the following a supporting tool for hotel operators to address these challenges with solutions that reduce costs and environmental impacts at the same time will be introduced. Existing approaches are briefly discussed and a new, holistic framework is presented. The tool under development will propose improvement options to decrease costs and the ecological footprint of hotel services. The hotel data, suggested measures and progress in implementation will be monitored and evaluated over time and therefore provide support and incentives for successful implementations.

### **Keywords:**

*Cleaner production, hotel industry, eco-efficiency, ecological footprint, tool development*

## Introduction – Current situation

Tourism has experienced constant global expansion in the last sixty years and has become a major economic sector with constantly high growth rates (Figure 1). “International arrivals are expected to reach nearly 1.6 billion by the year 2020” (UNWTO 2011). The average annual growth rate of international tourism is estimated to be around 4% between 1995 and 2020. This has triggered huge investments especially in the accommodation sector. In the hotel industry real estate investors and hotel operators are often different entities, with different objectives and goals. Real estate investments are often calculated and planned with narrow margins and with a focus on minimised investment costs. This habitually results in inefficient operations and higher operational costs which have to be covered by hotel operators. Solutions to improve this situation are complex and usually need major changes and often extensive renovations. The second reason for high overall consumption of resources and energy resulting in higher costs are cheap and inefficient technical installations and devices which lead to higher energy consumption, frequent replacement and intensive maintenance. This problem could often be addressed by the hotel operators themselves. An additional challenge to be mentioned here is the often inefficient process practice of poorly trained staff in kitchens, laundries and for heating, ventilation and air-conditioning (HVAC) devices. This issue should be addressed by the hotel management, but is often not a focus or there is a lack of capacity.

The Institute for Ecopreneurship is supporting hotel operators and managers to address these challenges with solutions that reduce costs and environmental impacts at the same time. Existing approaches and a new, holistic framework are presented in the following.

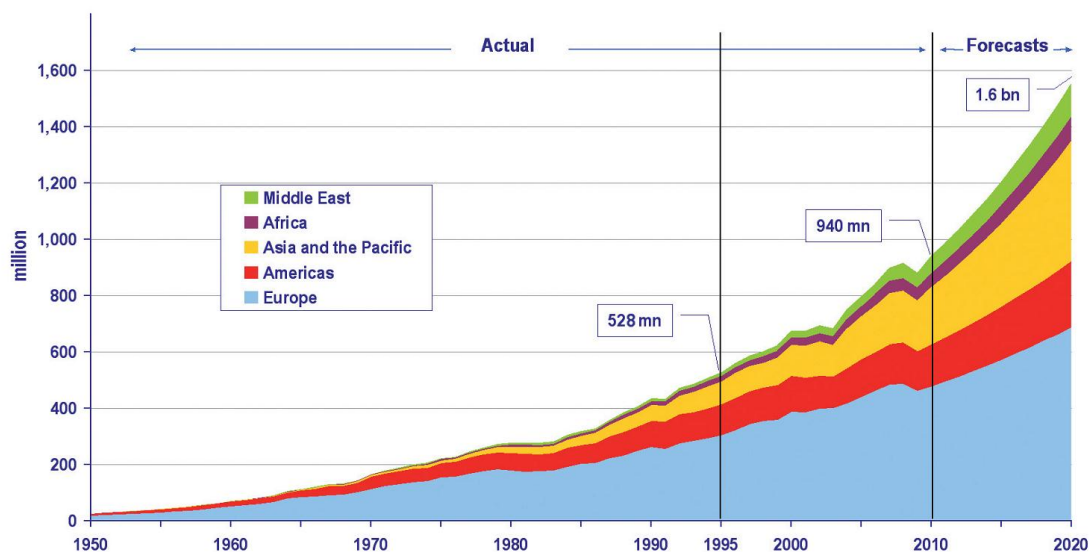


Figure 1 International tourist arrivals by region (Source: UNWTO 2011)

## A myriad of labels and tools for more sustainable tourism

Due to its generally high specific resource consumption compared with the domestic benchmark, the hotel sector holds large saving potentials. To improve eco-efficiency and become more competitive, resources have to be used more efficiently while also reducing the negative impacts on the climate and environment. Unsurprisingly, the worldwide demand for analytic tools and solutions, which increase the eco-efficiency, is growing. Some programs for the tourism industry have already been launched from the private and public sector. In Europe

more than fifty different ecological certificates and labels for diverse touristic offerings exist (Philipsenburg 2012, p. 54). These labels, certificates and other tools have different approaches and often specific focuses, e.g. on energy or water management. For hotel managers it is difficult to keep up with the different trends. However, from an environmental and economic perspective the choice for a certain label or tool is not important, what counts is the successful implementation of measures suggested by one or another assessment tool. But despite huge identified saving potentials, the implementation rate of suggested measures has been rather low in the past.

### **Objectives: An implementation-focused framework and tool**

Together with a partner from the hotel industry the Institute for Ecopreneurship is developing a hotel-specific assessment and implementation tool to address these aforementioned shortcomings. The Institute can rely on own national and international experience in cleaner production consultancy in the sector and the close cooperation with end users shall guarantee a customer-oriented solution. The goal of the project is to develop a globally competitive and sector-specific software tool linked with a service concept to identify, rate and implement eco-efficiency measures in the hotel industry. The tool should detect the financially and environmentally relevant processes and propose adequate measures based on best-available-technology, quantify their benefits, support their effective implementation and monitor the achieved improvements.

### **Proposed solution: Hotel Ecological Excellence Tool (HEET)**

HEET will be implemented as an online solution and allow simple data input from anywhere and anytime through web based technologies. Based on initially general data from the hotel management an estimation of the overall ecological footprint of the hotel operations is made. The ecological footprint is derived through a Life Cycle Analysis (LCA). Generated basic indicators allow a direct comparison with other hotels and benchmarks and act as effective guides for overall improvements. In a second step, detailed information about the relevant hotel processes will be gathered so that improvement areas with potential can be identified. This allows focused recommendations for solutions with high financial and ecological benefits. The hotel data, suggested recommendations and implementation progress are monitored and evaluated periodically.

### **Input: Required data**

As depicted in Figure 2, required data includes inventory data, which consists of facility data (amount of guest rooms, administration area, kitchen, restaurant, garden, parking space and other) and construction materials data. Operational data will be gathered on several levels: on the general hotel level, on hotel process level and for special processes for which largest saving potentials have been identified. This data includes consumption and costs of energy, water and other relevant resources such as food, beverages, cleaning materials, amenities, etc., amounts of waste generated as well as sales data such as guest-nights, sold meals for guests, meals for staff, etc.

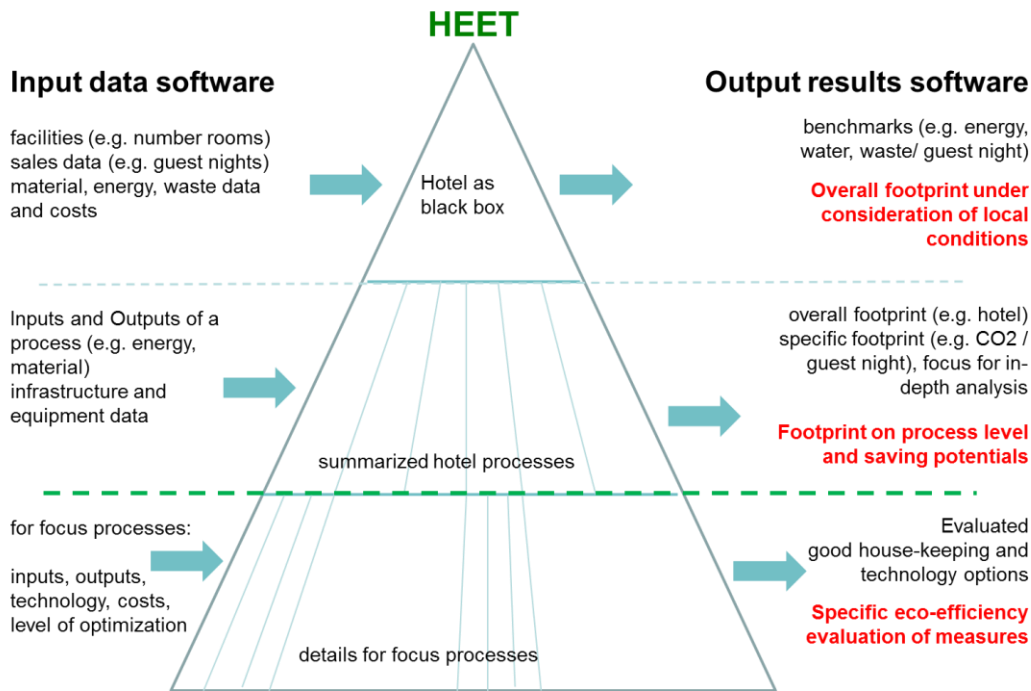


Figure 2 HEET - concept

### Output: Ecological footprint of a hotel - LCA

The above described data is used to determine the ecological footprint through using a life cycle analysis, which consists of four steps: the definition of the scope and goal (1), elaboration of the life cycle inventory (2), the impact assessment (3) and finally the interpretation (4). The two main objectives of the HEET approach are a convincing identification of improvement potentials in the whole supply chain of a hotel and to assure a high and successful implementation rate of the proposed measures. Therefore all hotel processes have to be within the system boundary of the eco balance including up- and downstream processes. One useful and recognized functional unit<sup>1</sup> is the environmental impact per guest-night. Many benchmarks and indicators in the literature refer to energy and water consumption or waste generation per guest-night. In an eco-balance these different aspects will be aggregated into one functional unit which considers all relevant ecological aspects. In an eco-balance the functional unit has the same meaning as an indicator mentioned above. The step elaboration of the lifecycle inventory means collecting required data from the hotel and feeding it into the software tool as described above. The amount of data fed into the tool should however be kept to a minimum in order to avoid unnecessary workload for the involved persons. High volume parameters such as energy, water or food with a significant impact on a guest night indicator must be more precisely assessed than for instance amenities for guests.

The selection of a suitable indicator in the impact assessment depends on the focus of the user. Indicators can be created for different purposes and objectives. But the interpretation of the results always requires certain know-how. HEET uses the ecological footprint. It covers the main impacts, is easy to understand and fulfils the needs of the hotel industry. "The Ecological Footprint measures how much land and water area a human requires to produce the resource it consumes and to absorb its carbon dioxide emissions, using prevailing technology"

(Global Footprint Network 2012). For example the current capacity of the earth for a sustainable life-style of one person is restricted to 2'000 m<sup>2</sup> per year which can be consumed in a luxury hotel easily just within two weeks holiday.

### **Output: Proposed measures on process level**

HEET will propose improvement options to decrease costs and the ecological footprint and therefore increase the eco-efficiency. With a traditional Cleaner Production approach a cross media assessment e.g. a ranking of benefits in water and energy consumption can be done only on a qualitative level. The ecological footprint allows a quantitative assessment and therefore focuses and simplifies the decision-support. For example, if the largest part of the ecological footprint of a hotel is caused by energy consumption, processes with high energy demand will be analysed in more detail. For these processes potential measures such as alternative lighting devices and better management practices will be proposed. Additionally, the hotel management can run different investment scenarios for these measures and will be provided financial key indicators like the estimated return on investments.

### **HEET – Benefits and challenges**

HEET offers hotel operators a cost-effective and pragmatic eco-efficiency and footprint analysis. The tool simplifies the analysis process, provides an intuitive way to input the needed data, offers a robust eco-efficiency analysis, proposes possible measures for improvement and estimates the return on investments in an easily accessible, transparent and understandable way. By reducing the ecological footprint and saving costs competitive advantages will be build up and allow eco-marketing. Since the future tool users – hotel managers, sustainability managers, hotel engineers, consultants and others – are distributed over the globe, it will also allow reducing the need of travel and will offer first consultancy via a web-based interface. Costly consultancy work at site can be focused on challenging technical questions or specific training. Moreover, hotel data, suggested measures and progress in implementation will be monitored and evaluated over time and therefore provide incentives for successful implementations.

### **References**

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<sup>i</sup> Unit used to normalize the different values of parameters and to allow comparison.