

Zero Waste Hotels: Challenges & Opportunities

The Greek Case

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Abstract

In many touristic regions in Greece, hotels and resorts produce more solid waste than local residents, putting significant pressure on the environment and natural resources. This is a major issue especially on Greek islands, which are closed systems with limited resources and infrastructures for effective waste management. In this sense, the paper examines the current situation of waste management in Greek hotels based in the authors' field experience, and identifies the challenges and opportunities regarding the implementation of zero waste programs. The paper presents the different waste management practices that can be applied within a hotel in order to prevent and minimize waste at source, and maximize reuse & recycling efforts. This way the paper aims to inform the stakeholders involved in touristic activities about the need for integrated waste management and to outline the necessary steps towards a zero waste strategy in the hospitality industry. In addition, the paper is supported by different case studies of good waste management practices already applied in Greek hotels. The paper shows that a zero waste program could be easily implemented at any hotel resulting in financial, environmental and social benefits. Zero waste plans in large hotel units or coalitions of hotels could ease the implementation and maximize the benefits.

Key words: hotels, zero, waste, management, recycling, tourism

Introduction

Tourism is one of the leading growth sectors of the Greek economy, attracting more than 22.5 million people each year, (Zikakou, 2014) contributing 18% to the national Gross Domestic Product (Hellenic Republic –Greece in the USA, 2015). The country is an attraction for international visitors mainly for its rich and long history, Mediterranean climate and gorgeous beaches (Hellander & Armstrong 2006). But, the growth of the Greek tourism industry through the last decades has added an increasing impact on the environment.

In many touristic regions in Greece, hotels and resorts produce more solid waste than local residents, putting significant pressure on the environment and natural resources. This is a major issue especially for Greek islands, which are “closed systems”. The lack of space and of adequate waste management infrastructure, the seasonal fluctuations of the population that is reflected to the waste generation and limited natural resources, put a lot of pressure on the islands. This emerging reality makes waste management in hotels a significant tool to deal with the burden of dealing with a vast amount of waste especially during the summer holidays.

Currently, sustainable waste management is not a priority for the Greek hospitality industry. On the contrary, the significance of a well established and sustainable waste management program is highly underestimated, since it is often limited to waste collection and the cost imposed by the relevant local authority (in most cases the municipality). The inability to identify the hidden costs related to the purchase of raw material, the involvement of personnel in waste management programs, the transport of materials and products as well as the management and storage of materials, limit the actions that could contribute to the important deduction of operating cost of the enterprise.

Zero waste programs within the hospitality industry could provide the solution to the above mentioned challenges. In this sense the objectives of this paper is to inform the stakeholders involved in touristic activities about the need to implement zero waste programs within the hospitality industry; to identify the challenges and opportunities regarding the implementation of those programs; and to outline the practical steps that hotels need to take so as to prevent and minimize waste at source, as well as maximize reuse and recycling efforts.

In the long term the paper aims to contribute into turning the hospitality industry in a more environmentally friendlier sector through the efficient use of materials and the reduction of waste produced, while providing services of high quality.

A Zero Waste Approach in Hotels

The goal of becoming a zero waste hotel is to limit as much as possible the negative impacts on the environment both by reducing the consumption of resources and by changing the practices within the hotel so that the waste produced to be used as raw material. More specifically, a zero waste approach describes a progression of practices and regulations which lead to efficient use of materials based on the principles of sustainability and circular economy. That means that the same materials are used again and again until the optimum level of consumption as described in Figure 1 (Song et. al, 2014).

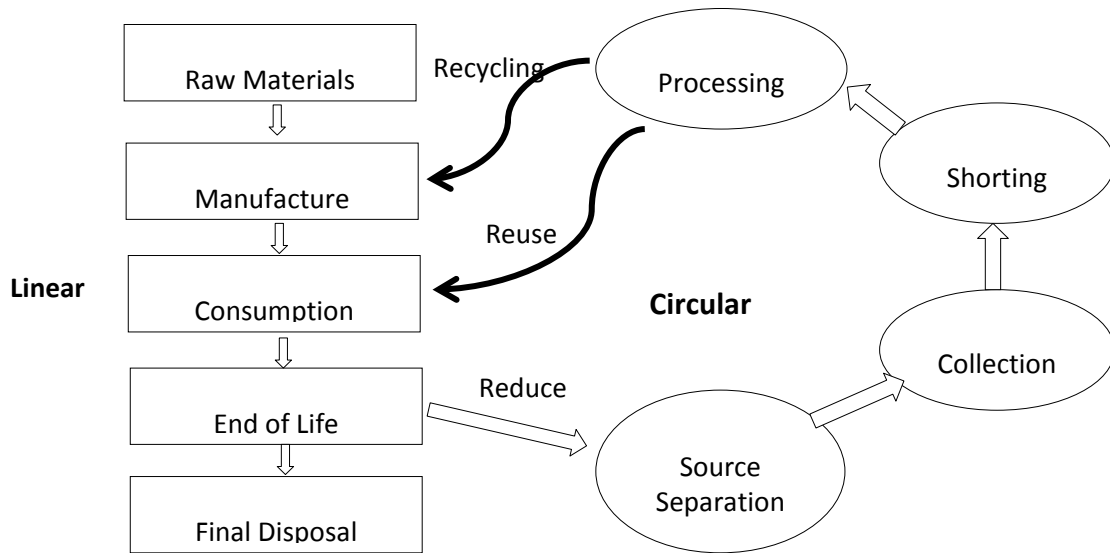


Figure 1: Leaner and circular flow of materials (D-Waste@)

A zero waste program aims to provide an insight to the internationally recognized 3Rs (Reduce, Reuse and Recycle) and waste prevention which are priority actions of the waste management hierarchy as described within the European Union's Waste Framework Directive 2008/98/EC

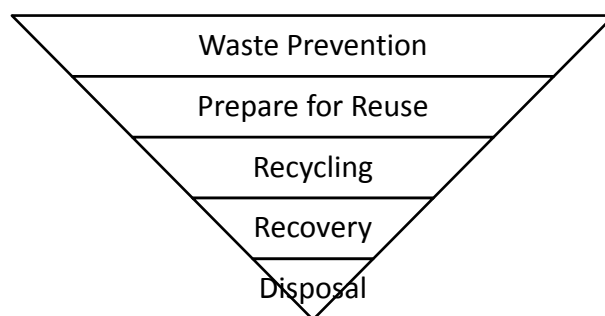


Figure 2. The pyramid of the waste management hierarchy-EU Directive 2008/98/EC

Becoming a zero waste hotel does not necessarily mean the elimination of all by-products. It means using resources efficiently, and when generation of byproducts is unavoidable, using those by-products

as raw materials for other processes (Sarah, 2002). Zero waste hotels means designing and managing materials and operations to systematically avoid and reduce the volume and toxicity of waste and materials, conserve and recover all resources and limitation of their final disposal.

But most important is that zero waste is an ethical, economical, efficient, and visionary approach which guide people (the personnel, clients and hotel executives) in changing their lifestyles and practices in order to create a closed loop of materials.

The benefits of those programs could be reduced costs and liabilities, high return and low-risk investments, increased profits, and positive cash flows. Apart from the above the implementation of appropriate zero waste plans in hotels and leisure facilities could contribute to:

- The protection and promotion of the socioeconomic environment of the touristic destinations;
- The limitation of pollution and to the full compliance with national and European legislation;
- The upgrade of visitor's "experience". Over the past decade there has been a shift in the expectations and demands of tourists who have become more sophisticated and are more interested in choosing hotels that promote green practices.
- Saving valuable raw materials and energy;
- The deduction of operational costs and to the higher operational efficiency of the personnel.

Furthermore, hotels that apply waste management systems that rely on the Zero Waste Hierarchy could be major contributors to the solution of inadequate waste management in most Greek islands, which are a global point of reference and a top seasonal destination for summer holidays.

Considering the above, hotels could incorporate in their environmental policy zero waste programs based on the top priorities of the waste management hierarchy, namely:

- Waste prevention and reduction;
- Reuse of materials;
- Recycling

In the design of a zero waste plan, the hotel managers should focus on four main objectives:

1. Consider the quantity and type of waste produced by each department of the hotel in order to control the flow of materials.
2. Evaluation of the purchasing decisions and purchasing products so that selected products can be reused, recycled or create less waste.
3. Understand the use of the equipment and products. A different use of products and equipment could lead to reduced waste of a hotel.
4. Engage personnel and clients.

Waste in Greek Hotels

Leisure facilities and hotel industry produce daily high amounts of useful materials, such as food waste, green waste from gardens, paper and cardboard, glass bottles, plastic bottles and other packaging, aluminum and ferrous cans, cooked and used oils. In addition, at regular intervals, other types of waste are produced such as furniture, electric and electronic equipment, batteries, C&D waste etc. With regard to the areas that waste is generated, main sources and types of waste are presented in table 1 .

Table 1. Typical waste in different areas within a typical Greek hotel

Area of Waste Production	Main Types of Waste
Guest Rooms	plastics bottles, plastic caps, newspapers, magazines, glass bottles, aluminum cans
Kitchens and Restaurants	food waste from food preparation and served meals, plastics and cardboards from unpacking products, metal and glass cans from food preparation, glass and plastic bottles from restaurants, aluminum cans
Rest rooms (bar / spa / pool / fitness);	glass and plastic bottles, plastic caps, magazines
Conference rooms;	glass and plastic bottles, paper
Reception area, administration offices;	photocopy paper (A4)
Laundry and rooms for other services;	plastic and cardboard packaging
Warehouses	plastic and metal packaging
Garden and green areas	green waste

The amount and composition of waste produced in a hotel depends a lot on the parameters provided below (Owe et. al, 2013):

- the size and the type of the hotel;
- the occupancy of the hotel;
- the number and the size of the meals served;
- the activities of visitors and personnel;
- the supply activities of the hotel;
- the number and the type of enterprises that rent an area/store inside the hotel.

Based on field work as well as literature review (Bohdanowicz, 2005) the daily average waste generation per visitor in a hotel ranges from 1 to 2 kg.

The average composition of waste produced in a typical Greek all inclusive hotel is displayed in Figure 3. As it can be observed recyclables (mainly glass, plastics, cardboards and metals) is the dominant fraction followed by organic waste. In total, organics and recyclables represent 97% of the waste generated in a hotel. 60-80% of this could be valorized through reuse, recycling and composting activities.

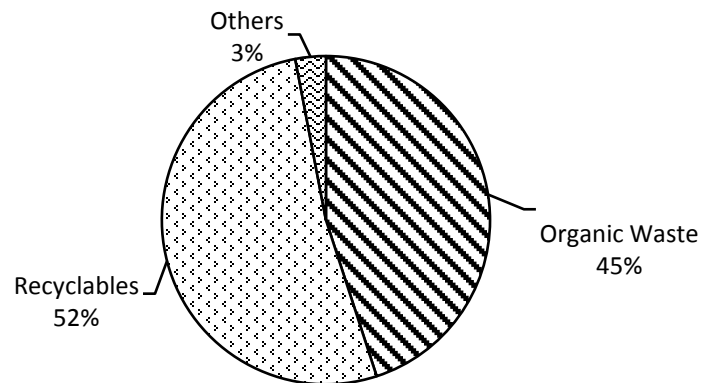


Figure 3: Waste composition for waste generated in all inclusive hotels (D-Waste @)

Waste produced in Greek hotels creates in many cases significant challenges which is a burden especially for large all inclusive hotels (more than 500 beds). Some of the most significant challenges are:

- The management of a very high amount of waste which pose significant visual, odor or noise nuisance when it is stored within the “boundaries” of the facility and collected through inappropriate roots.

- The absence, in some cases, of frequent municipal waste collection. In these cases the hoteliers have to transfer their waste by their own means to the closest waste collection point, in order to avoid storage of a large amount of waste for a long term within their premises. This is a significant challenge especially for hotels that have limited storage space.

Waste Prevention & Reuse

Setting a waste prevention plan is the first step towards the implementation of a zero waste program in a hotel. However, most hotels tend to implement a waste recycling program before identifying any opportunities of minimizing waste production at source. Though, they are also missing the opportunity to reduce requirements of handling an excess amount of waste, which otherwise would have been avoided.

Waste prevention and reuse means using less raw materials, optimal use of supplies and equipment and the acquisition of products that are more resistant, and easily serviceable. Waste prevention is one of the easiest methods to reduce waste since it can be controlled at the time of purchasing products and services. What a hotel purchases is directly linked to what it throws in the waste bin. Moreover, all of the resources and financial costs of materials, manufacturing, labor, transportation, packaging, storage and disposal are wasted when a product is discarded (Favro & Brebbia, 2013).

In order for the hoteliers to identify waste prevention opportunities, a very good understanding of the hotels operations and flows of materials is required. A list of indicative good practices aiming at waste prevention, minimization and reuse is provided below:

- Prefer buying products in bulk than in individual packages;
- Avoid using disposable products;

- Avoid products with too much packaging;
- Prefer to work with suppliers that provide products in packaging from recycled materials;
- Buy fresh products in returnable crates or containers and encourage suppliers to take back the packaging;
- Use carafes instead of bottled water;
- Replace individual toiletries in rooms with refillable containers.
- Remove plastic bags from guest accommodation bins (not bathroom bins)
- Provide materials from renovation activities, such as furniture and electric equipment to the personnel and/or donate it to non- profit organizations.

Recycling

Setting a recycling program is the next step towards the implementation of a zero waste system in a hotel. Having identified all sources and streams of materials generated in the hotel, hotel managers need to decide which materials will be included in the recycling program. The established local recycling industry and its demand on recyclables (amounts and types) are the main parameters that influence the financial viability of the recycling program. In this sense a technoeconomic study needs to be conducted prior to any recycling activity. The study needs to identify the recyclables to be included in the program, the departments that will participate in the program, the type and means of collection and temporary storage. Furthermore, all relevant costs including equipment supply, and personnel costs, as well as savings from sales of recyclables shall be determined.

Type of Collection

Depending on the demands of the final recipient of recyclable materials – either a public body or a private sector company – collection of recyclable materials can be made in:

- A single stream for comingled recyclable materials. In this case all recyclables are collected in a single bin and their separation is made in central recycling facilities.
- Two or more streams with separate collection at source. By applying this system, waste collection bins of different colour and reception point are put in several points of interest aiming to collect separately recyclables (paper, metals, glass, hazardous materials, etc.).

Temporary Storage Point of Recyclables

After collecting the recyclables from several points of the hotel, there is a need to be gathered in an appropriately shaped central area that allows easy access of the vehicles that will receive the materials. The central area will be equipped with the appropriate temporary storage equipment. Depending on the amounts of the recyclables gathered and the frequency of removal, the equipment might include big recycling containers (i.e. 1.1 m³), small containers and special containers for glass. In large leisure facilities where production is bigger, the use of compaction equipment, especially for cardboard, is highly recommended, aiming not only to deduct the store area requirements but also to facilitate their transfer.

Organic Waste Management at Source – Composting

A basic element of a zero strategy for hotels is the separation of organic waste at source and its treatment. Taking into account that almost half of the waste generated in all inclusive hotels is organic, significant waste reduction could be achieved through proper management of organics.

The most important sources of organic waste in an average hotel are:

- a) The kitchen and in general the areas of meals' preparation, and
- b) Gardens/green spaces (if available), that generate green waste from pruning.

Operation of cuisines, meals' preparation and serving generate up to 0.5 kg per meal served (Singleton, 2012; Owen, 2013). Most of this organic waste comes from:

- Inappropriate food materials: anything in the cook house that is not appropriate for use, i.e. rotten and visually imperfect materials, expired products, etc.
- Food waste from preparation of meals: anything that is not served to the visitors, i.e. peel from foods, inedible pieces that is either burnt or accidentally dropped on floor, bones from meat and fish, etc.
- Excess food, i.e. prepared meals that have not been served, leftovers, etc.

Two main measures have been identified so as to deal with food waste from hotels:

- Composting: The main advantage of composting is that it deals effectively with all the types of food waste produced, i.e. leftovers, etc. that cannot be used in another way, in addition to the fact that it provides a solution for the other main organic waste fraction, that of green waste from gardens. There are several types of composting that can be applied, especially in such cases that waste streams are "clean", whereas the compost produced can be used as soil conditioner, reducing in that way also the needs for irrigation and fertilizers. Hotels that have large open spaces could apply open-air composting with compost piles, which is an affordable method. In these cases it is important to place compost piles in a distance from the guest rooms in order to

avoid odors nuisances. For hotels that lack space, mechanical composters could provide the optimal solution to compost food waste within their premises.

- Participation of hotels in web platforms that offer excess meals to organizations and charities is a proposed measure to minimize organic waste. In addition such practices contribute in enhancing hotel's corporate social responsibility.

Engage Employees and Visitors

In order a zero waste program to be successful, it is more than necessary to communicate its implementation among the personnel and the customers of the hotel.

Briefing of customers can be made through several means including:

- Brochures at receptions and rooms;
- Video footage viewing on rooms' TV and screens regarding the environmental policy that the hotel implements;
- Information on mobile phones when connecting to the WiFi network of the hotel;
- Special "Green" events.

However, the big challenge of communication has to do with the awareness of the hotel's personnel. Special attention should be paid at the training of personnel that is involved directly in the management of the waste generated (i.e. waitress, kitchen's personnel, maids, etc.). Since, they are directly involved to the activities related to recycling, reuse and waste prevention they must be able to understand how the system works. At the initial phase of the program, it is suggested creating groups of employees from different departments and of the same responsibilities and engaging each group to recycle no more than two or three types of recyclables. This approach contributes to a step by step engagement of the

employees to the program, and minimizes system's failure. Furthermore establish a Green Team and engage hotel executives to run the zero waste program. Creating "green teams" is an inspiring way for hotels to motivate employees and shift their strategies towards sustainability.

The Greek Example: Case Studies

As it has already been mentioned above, waste management in the Greek hospitality industry is new. Currently, there is no example of a Greek Hotel implementing zero waste strategies. However, there are few examples of Greek hotels that implements intensive recycling programs and are investigating ways of expanding their programs towards a zero waste philosophy. Below, the cases of three well known Greek hotels are presented as well as the example of a very interesting Greek initiative.

Integrated Recycling Program in Sani Resort, Halkidiki

The Sani Resort in Halkidiki, Greece has four hotels (a total of 800 rooms, 15 restaurants and bars, conference rooms). The resort applies an integrated waste reduction and recycling program at source and a composting pilot project. In a seven year implementation of the program the resort has achieved 40% recycling rates, while setting more ambitious targets for the upcoming years. In 2014 the resort recycled 225 tonnes of waste, specifically 138 tonnes of glass, 47 tonnes of paper, 13 tonnes of plastic, 4 tonnes of cans and 2 tonnes of batteries and electrical equipment and 21 tons of cooking oils. Furthermore, the hotel is in the pilot face of composting almost 200 kg of organic waste per day. Batteries, ink cartridges and old equipment and computers collected as well and delivered to official recycling systems. Materials from renovation activities (e.g. furniture, TV sets) e.g. are provided for free to the personnel or donated to non-profit organisations. (Sani Resort, 2014)

The hotel managers have put a great effort on communicating the program to the clients and to the personnel. Personnel are trained on recycling practices regularly, while promotional materials have been developed in order to best communicate the program to the visitors. It is characteristic that each year the resort organizes the "Sani Eco Day" during which visitors can enjoy a more "green" vacation, participating in a series of exciting ecological activities, such as construction of recyclable materials.

Composting of Food Waste in Hilton Hotel Athens

Hilton Hotel Athens is a prestigious 508 bedrooms site in Athens, Greece with conferencing, spa, restaurants and bars. Being at the forefront of waste reduction practices, Hilton Athens hotel initiated in 2013 a food waste management program. Food waste produced from the preparation of kitchens and the leftovers from restaurants are collected in bins for organic waste only. Then the waste is directed to an installed integrated composting unit which is parted by a dehydration unit and a mechanical composter (Tidy Planet, 2014). The role of the dehydration unit is to extract water from food waste and minimize its volume and weight at less than 50%. Then the output is fed into a mechanical composter of continues operation and of 2,000 l capacity. Its composting cycle lasts 15 days and the output of the process is a nutrient rich compost. The hotel composts almost 0.7 tonnes of food waste per week achieving a reduction in food waste of almost 90%. Emphasis has been given to the communication of the program to the personnel involved to it, so as to increase participation to the program and minimize impurities within the organic waste bins. (Vekkos, 2014).

Green Engage "Athenaeum, Intercontinental, Athens"

Athenaeum, Intercontinental, Athens is a 559 bedrooms unit, which hosts a great number of prestigious conferences. The hotel is included in the InterContinental Hotels Group (IHG) chain carrying out an innovative operational and maintenance endeavor the Green Engage, which tracks

day-to-day environmental impact stemming from hotel operations. Under this framework the hotel implements an integrated waste recycling program since 2008 with the aim to improve its overall carbon footprint performance, raise environmental awareness, achieve better cleaning and disinfection and minimize waste storage requirements. The hotel recycles, in annual basis, 50 tonnes of glass, 60 tonnes of paper, plastic and aluminum, and 6 tonnes of cooking oils. The hotel has successfully engaged its personnel in the “Green Engage” program through regular training and update (Athenaeum Intercontinental@, 2015)

Recycling Soaps from Greek Hotels- The “Clean Hands Initiative”

“Clean Hands” is a non-profit organization (www.cleanhands.gr) started its activity in 2012 on the island of Kos, Greece based on the idea that in a period of deep crisis and recession there is a need not only for food but also for basic sanitary items. The organization is collecting soap residues from hotels and after proper processing and microbiological testing it transforms them into new soaps and offers them to vulnerable social groups. Besides the significant social impact, the above process is a serious energy environmental protection action, since it reduces the volume of waste from hotels and utilizes 100% recyclable materials such as soaps, which would otherwise end up in landfills and would affect long subsoil and the ecosystem. So far the program has been implemented in more than 100 hotels around Greece and the numbers are expected to further increase in 2015 (D-Waste, 2015).

Conclusions

The current inadequate waste management in most Greek tourist destinations and the need of the hospitality area to improve its environmental performance makes the design and the implementation of sustainable waste management programs an emerging necessity for the sector. Zero waste programs in hotels, could be a valuable tool for the Greek tourism to become greener and contribute

to the sustainable use of materials. This is especially beneficial for large hotels and/or coalitions of smaller units which could apply a common zero waste program in the view to increase the financial, environmental and social efficiency of the program. Currently, there are only few hotels that implement waste management programs with emphasis to recycling. In this sense there is a need to communicate the concept of zero waste in more hotels around Greece and provide them the necessary guidance and training of how to best implement programs which will target in waste prevention, reuse and recycling.

It is also recommended that the hoteliers shall look into opportunities of working together with local communities and participate in initiatives that introduce innovative ways of dealing with waste. Finally it is rather important for the hotel owners to understand that the success of a zero waste program depends a lot on the engagement of the personnel that is directly involved in the waste management practices applied within the facility.

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