

Solid waste from the hospitality industry in Cyprus

A. A. Zorpas¹, K. Lasaridi², I. Voukkali³, P. Loizia³
& V. J. Inglezakis³

¹*Cyprus Open University, Faculty of Pure and Applied Science, Environmental Conservation and Management, Nicosia, Cyprus*

²*Harokopio University, Department of Geography, Athens, Greece*

³*EnviTech Ltd, Institute of Environmental Technology and Sustainable Development, Department of Research and Development, Paralimni, Cyprus*

Abstract

Solid waste generation and disposal is one of the most negative impacts of hotels on the environment. Hospitality industries often pay little attention to their environmental responsibilities. Solid waste is a key concern in the hospitality industry. Typically, a hotel guest can produce 1 kg of waste per day that accumulates to thousands of tonnes of waste annually. Many hotel operators have very little interest in reducing and/or recycling waste, believing that such activities are too expensive and time-consuming. The main objectives of this study were to provide data regarding the solid waste management from hotel and present typical practices for waste prevention / minimization at source.

Keywords: hotels solid waste, prevention activities, waste minimization.

1 Introduction

With a rising level of prosperity in industrialized countries, an increasing number of products and services are being produced and consumed. This critical expansion is replicated in the amount of waste generated [1]. The last 30 years the total amount of municipal solid waste has been continuously increasing. In 2008 (according to the official statistics from Eurostat which was published in 2011), the total waste generation in the EU-27 was up to 2.62 billion t. This was slightly lower than in the years 2004 and 2006 where the EU-27 total amounted



to 2.68 billion t and 2.73 billion t respectively. In 2008, 98 million t or 3.7% of the generated total were classified as hazardous waste. This means that per capita in 2008 each EU citizen produced on average about 5.2 t of waste, of which 196 kg were hazardous, [2]. According to Waste Framework Directive (directive 2008/98/EC), waste prevention are the measures taken before a substance, material or product has become waste, that reduce the quantity of waste, the adverse impacts of the generated waste on environmental and human health or the content of harmful substances. The waste hierarchy has been applied as a priority order in waste prevention and management legislation and policy and prevention is addressed as its first priority. As the disposal of waste to landfills produces methane (CH_4), a stronger than carbon dioxide (CO_2) greenhouse gas, waste prevention has a positive effect on mitigating the climate change. Preventing waste means reducing the amount of waste generated, reducing the hazardous content of that waste and reducing its impact on the environment. Waste prevention includes **strict avoidance** of waste generation **qualitative and quantitative reduction** at source, and **reuse** of products. It does not include recycling of materials and separate waste collection [3]. Several researches on reducing the environmental impacts of the hotel industry have concentrated on larger hotels and major hotel players [4]. Nevertheless over much of the world, there are large numbers hotels. This research was designed to identify the challenges facing the hotels in implementing sustainable solid waste management (SWM) practices and to develop a best practice model for SWM in several. In Cyprus hotels are clarified from Cyprus Tourist Organization in stars (2–5 stars depended from their activities, number of rooms, variety of food etc.). The International Hotel Environmental Initiative [5] indicated that solid waste generation is considered one of the most adverse environmental impacts created by several and especially small hotels. Collectively, they produce a vast amount of waste, much of which goes to landfill. Many hotels consider their environmental responsibilities as a secondary objective [6] and take very little action to reduce their environmental impacts [7]. Landfill from waste from hotels contributes to the degradation of the environment through the pollution of groundwater resources due to the creation of leachates, and the emission of explosive gases, e.g. methane [8]. It also causes problems to the surrounding communities in the form of odour, flies, litter and noise [9].

2 Description of the selected area. methodology

Cyprus is situated in the north-eastern part of the Mediterranean Sea, 338 east and 358 north of the Equator. It is situated 75 km south of Turkey, 105 km west of Syria, 380 km north of Egypt, and 380 km east of Rhodes (Greece). The third largest Mediterranean island after Sicily and Sardinia, with a total population up to 900000 citizens (according to the official statistics of Interior Affairs from 2011), it has an area of 9251 km², of which 1733 are forested. Cyprus has a record of successful economic performance, reflected in rapid growth, full employment conditions and external and internal stability, almost throughout the post-Independence period [10]. Cyprus is presented with almost 1000 hotels



according to the Cyprus Tourist Organization (CTO, 2010). The selected area belongs to the Municipality of Paralimni which is presented with 115 hotels according to CTO (2010) and with a permanency population of almost 22000 citizens, while it has the ability to quest up to 50000-75000 tourist per day. The Municipality consists of the main economical lung of the island due to the fact that in this area there are the largest hotel resorts. In undertaking this work, the following phases have been carried out: (a) reviewed the current legal framework, policies and pending initiatives in relation Waste Management as well as conducted a Stakeholder analysis in order to firstly identify the main stakeholders and secondly to define their expectations; (b) undertaken an analysis of waste generation and disposal at each of the selected hotels through the use of a customized questionnaire for the collection of data; (c) purposed pest practices for waste minimization.

3 Results and discussion

The main objective of stakeholder analysis was to identify key groups, bodies and/ or individuals and secondly to define their expectations along with their level of involvement in the area of waste management. Main Stakeholder is the Cyprus Tourism Organization, followed by the Local Authorities and the Cyprus Hotel Association while the Department of Environment plays a significant rule. The methodology used to identify the legal framework, consisted of a desk study and face to face interviews. All current EU and national legislation in regards to solid waste were found on official websites (e.g. Environmental Department - ED, Ministry of Agriculture -MA-, National Resources and Environment -NRE-, European Commission-EC) and reviewed so as to provide an understanding of the legal obligation hotels have in regards to solid waste management. According to the ED, MA, NRE, in Cyprus there are three pending initiatives in regards to solid waste management which includes: (i) Legislation on management of tyres; (ii) Legislation on excavation and demolition waste; (iii) Waste Framework Directive 2008/98/EC. The collection of baseline data was carried out through the use of a customised questionnaire (Table 1). The sample size consisted of 8 hotels belonging to the regions of Protaras Area (Paralimni Municipality). Both certified (2), with environmental management systems, and non-certified hotels (6) were included in the sample size. In addition, the sample size consisted of hotels with various ratings/ categories (5*, 4* and 3*). It was observed that none of the non-certified hotels has an environmental awareness program available for its employees. As a result, employees of such hotels do not get education or training regarding environmental issues for example, management of solid waste, recycling, practices for waste minimization etc. It was also observed that more than 80% of the sample size does communicate environmental efforts made, to guests and public. Concerning the seasonality of the hotels, only one is remaining open throughout the year adding to their total waste production. The others from 1/11 until 1/4 every year remains closed. In relation to the nationality of the majority of tourists visiting the hotels belonging to the sample



Table 1: Data collection using the sample questioner.

Hotel Category Holding or Non Certification in EMS	<u>OFFICE</u> Do you use double-sided printing and copying in the hotel's offices	<u>MANAGEMENT</u> Will you be willing to work in collaboration with other hotels in order to manage your organic wastes?	What streams of solid waste do the hotel produce and in what quantities per department?
Nationality of tourists who visit the hotel	<u>HOUSEKEEPING</u> Does the hotels used refillable soap and shampoo dispensers in guestrooms small plastic amenity bottles. Does the housekeeping department use a dosing system for cleaning chemicals individual cleaning bottles.	Are you willing to replace small plastic amenity bottles with refillable soap and shampoo dispensers in guestrooms?	Plastic, paper, glass, wood, organic, old durables (old furniture, computers, bed linen, etc), electric and electronic equipment, green waste (grass, etc), clinical waste (sanitary towels, etc), hazardous (plastic containing chemicals, etc) sands (backwash) dust (filters), metals packaging and waste
If the hotel has an environmental awareness programme for employees	Does the hotel regularly purchase recycled products	Will you be willing to encourage your suppliers to minimize packaging, re-use packaging and use packaging with recycled content (except for food packaging)	packaging, batteries
If the hotel is presenting environmental efforts visibly communicated to guests and public	<u>Kitchen and Bars</u> Do hotel suppliers take back pallets, plastic containers and refillable containers Does the hotel purchase and serve beverages from dispenser/bottles	Consumption of Energy Water Chemical Raw materials Pesticides Textiles Cooking oils fertilizers etc	How is the hotel disposing of each of the streams of waste
Does the hotel provide recycling bins around its grounds			Is the hotel involved in a recycling program
If the hotel presented with environmental activities			

size, it was observed that they are British by up to 70% followed by Scandinavian, German, Russian and French. Nationality behaviours affect the environmental performance in each hotel.

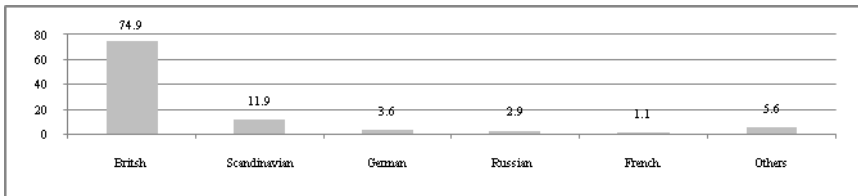


Figure 1: Nationalities presented in the hotels.

For example (according to our research), hotels that have tourists from Britain presented with high water consumption (as the water in the UK is typically free of charge) while those from Scandinavia presented with high energy consumption (due to the light nights and the fact that when they are on holiday they cannot realize that they have to switch off the lights when they go out of the room). In addition, hotels with gardens, grass, etc presented with high chemical consumption and chemical fertilizers. All the examined hotels presented with high chemical consumption regarding the pool maintenance. The main chemical that they used includes chlorine, acid and sodium base, in order to balance the pool. It was estimated that the chlorine needs per cubic, per pool and per operation day are up to 3.09×10^{-4} Kg while the Acid need is up to 1.07×10^{-4} Kg. The several streams of solid waste generated by the hotels includes: Plastic, Paper, Glass, Wood, Organic (kitchen), Old durables, Electric and Electronic Equipment, Green Waste, Clinical Waste, Hazardous, Sands (from the filters of pools), Dust, Metals, Packaging and waste packaging, Batteries, Solid waste from Biological treatment, hazardous from funnels and especially from the kitchens funnels. Due to the absence of a waste measuring mechanism, the hotels were not able to provide the exact volume of waste produced per department. In order for the hotels to be able to reduce their solid wastes, they should be able to measure their waste volumes in implement waste minimization practices. As a recommendation, hotels should first incorporate a measuring mechanism in order to obtain the total volume of wastes produced. As a further recommendation, hotels should adopt appropriate measuring mechanisms in order to be able to quantify the volumes of wastes produced per department. By adopting these measuring mechanisms, hotels will be able to set more accurate and effective targets which will result to a more rational reduction of solid wastes. The various methods that each hotel uses for managing or disposing of the above streams of wastes, presented in Table 2.

Based on the results, the majority of wastes are managed or disposed by being rejected in landfills or by being recycled. Results indicated that all hotels included in the sample size are involved in a Recycling Program. The recycling program is under the responsibility of Green Dot (Cyprus) Public Co Ltd “GreenDot”, the only waste stream collection scheme that exists in the country

Table 2: Managing/disposal methods of waste streams in the examined hotels.

Waste streams	Disposal methods									Best implemented practices from the hotels examined	
	A	B	C	D	E	F	G	H	O		
Plastic	7	3								Use of refillable dispensers for soap and shampoo Use of dosing system instead of individual cleaning bottles Purchase of reusable or durable material Turning the glasses in guestrooms upside down instead of using plastic covers	
Glass	8		2							Use of post mix instead of glass bottles	
Paper	8		2							Double sided printing and using one-side printouts as scrap	
Wood			3	6	3				4	Reusing as raw material for other wooden products	
Organic			8			4				Not identified any although they accept composting	
Old Durables		4		6	4				1	Reusing old linen as cleaning clothes	
WEEE	5		2		3			3		Not identified, some hotels reuse items	
Green Waste			8			2			4	Composting and use as fertiliser	
Clinical	8					3				Not identified, some of the hotels they burn them	
Hazardous	5	5	2		2	2				Refill (e.g. refill inkjet and toner cartridges)	
Sands			3				8			Not identified	
Dust							8			Those who are very close to the beach sent it there	
Metals	6	2	1					2		Purchase of reusable or durable material	
Packaging Waste	8	4								Use of rechargeable batteries	
Batteries	8									Recycling	
The number indicated the number of hotels that participate in the disposal methods											
A: Recycling	B: Reuse and recycle		C: Landfill		D: Burning		E: Reuse	F: Sanitary land fill	G: Drainage system	H: Return to supplier	O: Other

and consists of: PMD, Paper, and Glass. In the Municipality of Paralimni and especially in the tourist area the Green Dot established up to 80-95 recycle points giving a total amount of (273000 Kg from the tourist area regarding the recycle material). GreenDot cooperates with AFIS Cyprus Ltd and WEEE Electrocyclus Cyprus Ltd which are the waste collection schemes for batteries and accumulators and for electric and electronic equipment waste, respectively. Based on the results all the examined hotels provide recycling bins around their grounds. During the research the interviewees expressed their views and personal opinions which reflect their willingness to protect the environment and how they

Table 3: Waste minimization practices per department.

Offices	Housekeeping	Food and beverage	Eco purchasing guidelines for energy efficient equipment
Use a centrally-placed or electronic bulletin board for messages instead of making multiple copies of memos	Select vendors who take back reusable containers, pallets and other waste packaging	Use only reusable dishes and flatware in restaurants and employee cafeteria	Purchase A/C equipment sized for the area of use. Install heat recovery units on large A/C systems to preheat water
Shred office paper and use it to package shipments	Request that manufacturers package products in returnable and/or reusable boxes and crates	Use filters in deep fryers to extend the life of cooking oil	Install lighting controls (timers or occupancy sensors) to turn off lights in unoccupied areas such as storage rooms, employee rest rooms, walk-in coolers, etc
Reuse envelopes and folders for routing in house mail and correspondence. Make double sided copies when possible	Use refillable bath soap, shampoo, hair rinse and hand lotion dispensers for guest rooms to eliminate soap pieces and plastic bottles	Request fruits, vegetables and meats to be packaged in reusable crates, or recyclable boxes	Use photovoltaic lighting systems for lighting advertising signs, walkways, plants, trees, decorative water fountains and remote out-door areas
Use electronic mail for correspondence when possible	Refinish and reupholster damaged and dated furniture	Use glass or plastic coasters to reduce cocktail napkin waste	Use dishwashing machines that use final rinse water for the prewash of the next load of dishes
Non-toxic inks, unbleached and chlorine-free papers, nontoxic, biodegradable correction fluid	Use clothes hangers left by guests for employee uniforms or return to the dry cleaners and recycle plastic garment bags	Use dry, concentrated dishwasher chemicals in dispensers to reduce chemical spills and waste	Use copy and fax machines which have power down/stand-by features that operate when machines are idle
Equipment that does not require batteries, rechargeable batteries for small calculators communication radios and flashlights	Purchase vacuum cleaners with reusable bags vs. disposables ones. Purchase cleaning products with less hazardous constituents	Reduce the need for pesticide applications by eliminating clutter where pests might hide; sealing cracks around doors where pests may enter	
Chart the shelf life of items (i.e., toner, correction fluid) and purchase only the needed quantity	Use a hazardous chemical containment pan to prevent leaching of unused chemicals	Draft beer in returnable/refillable kegs to reduce the quantity of bottles and cans requiring disposal	



will become more “Green”. These views and opinions are listed below: 6 out of 8 hotels are willing to collaborate with other hotels in order to manage their organic waste; 3 of the hotels which are now using individual plastic amenity bottles for soap and shampoo are willing to replace them with dispensers; 3 of the hotels which are now using individual cleaning bottles are willing to replace them with a dosing system; all of the hotels; 6 of the hotels are willing to encourage their suppliers in order to minimise their packaging, reuse packaging or use recycled packaging; 6 of the hotels are willing to stop using plastic or paper glass covers and, instead, turn the glass upside down.

4 Guidance’s for waste minimization

Table 3 presents a typical practice for waste minimization from selected department of the hotels. Waste prevention is one of the easiest methods of reducing waste and can be controlled at the time of purchasing products and services. There is a direct correlation between what a hotel purchases and what it throws away. However, no matter how well planned your waste reduction and recycling initiatives may be, they probably won’t succeed without the support of the hotel department managers and staff. Successful hotel recycling programs require employee involvement, training and recognition. In addition, all of the resources and economic costs of materials, manufacturing, labor, transportation, packaging, storage and disposal are wasted when a product is discarded. Purchasing products made with recycled content creates outlets or markets for the materials collected in the hotel’s recycling program. As such, procurement sustains the recycling process and in turn, reduces the amount of waste going to the landfill. The benefits from waste reduction can summarise to: savings through reduced purchasing costs; reduced waste disposal costs; reduced energy consumption and pollution; conservation of natural resources.

5 Conclusion

The United Nations World Tourism Organisation defines sustainable tourism as tourism that meets the needs of present tourists and host regions while protecting and enhancing opportunities for the future. Sustainable tourism can only be achieved if all stakeholders involved (tour operators, environmental bodies, and local authorities). Unfortunately, different organisations had different views on what sustainable tourism means as well as the existence of policies, plans and actions on waste management. The CTO operates as policy making body at the strategic level as well as a competent authority at the hospitality unit level. Local government has the responsibility to implement the waste management directions at the local level with the assistance of the approved recycling companies. With the proposed new legislation (directive 2008/98), Municipalities have a better say on the management of waste within their sphere of influence. Local government with the new legislation has the right to impose sanctions and penalties in cases where business do not conform to the stated recycling programmes. On the other hand, if the pay as you throw principle is



adopted hospitality businesses could potentially save thousands of €, that could potentially finance their waste management actions. Additionally, the hotels should be able to measure solid waste reduction. For this reason, it is recommended that hotels begin to measure the total volume of waste produced. When this is achieved, the hotels are encouraged to make the measurements more specific and start quantifying the volume of waste per department. As a result, specific, measurable, achievable, realistic, time bound departmental targets can be determined for a more rational reduction of solid waste.

References

- [1] Salhofer, S., Obersteiner, G., Schneider, F., Lebersorger, S., (2008) "Potentials for the prevention of municipal solid waste", *Waste Management* 28, 245–259.
- [2] Eurostat, (2011) http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Waste_statistics (Accessed on 16 April 2012).
- [3] Pre-waste, (2012) <http://www.prewaste.eu/prevention-policies/item/55-what-is-waste-prevention?.html> (Accessed on 16 April 2012).
- [4] Morrison, A. (2002) "Small hospitality businesses: Enduring or endangered?" *Journal of Hospitality and Tourism Management*, 9(1), 1–11.
- [5] IHEI. (2002). *Hotels care: Community action and responsibility for the environment*. London, UK: International Hotel Environmental Initiative.
- [6] Goodall, B. (1995). "Environmental auditing: A tool for assessing the environmental performance of tourism firms". *Geographical Journal*, 161(1), 29–37.
- [7] Radwan, R.I.H., Jones, E., Minoli, D., (2010) "Managing solid waste in small hotels" 18,(2) March, 175–190.
- [8] Becklake, S. (1991). *Green issues thinking for the future waste disposal and recycling*. London: Aladdin Books.
- [9] Kharbanda, O.P., Stallworthy, E.A. (1990). *Waste management: Towards a sustainable society*. Farnham, UK: Gower Publishing.
- [10] Zorpas, A.A., Coumi, C., Drtil, M., Voukalli, I., (2011) "Municipal Sewage Sludge Characteristics and Waste Water Treatment Plant Effectiveness under Warm Climate conditions", *Desalination and Water Treatment*, 36, 1–15.

