

# TOURISM AND ENERGY SAVING – ENERGY UPGRADING CASE STUDY OF EDEN HOTEL IN ANAVYSSOS - GREECE.

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## Abstract

In recent decades tourism sector is developing in one of the world's largest business sectors, employing over 200 million people today. Among other resources, the hospitality industry uses significant amounts of energy to provide comfort and services to its guests, usually with an alarmingly low level of energy efficiency.

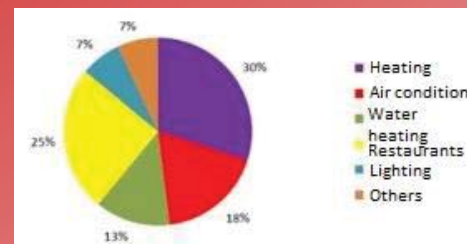
Environmental impacts include emissions and pollution of water resources, soil, air, noise, and excessive use of natural and other resources.

The case study of this work is EDEN hotel in the area of Anavyssos-Athens. The hotel recently made an effort to upgrade its energy production for the hot water system. For this purpose, two water heat pumps were installed, replacing the old oil boiler system. The study tries to evaluate this energy upgrade in a specific but also in general context. Some of the tools - methods which were used to evaluate this action are: multi-criteria analysis, questionnaire and registering the energy demands.

## Introduction

The sustainable consumption of energy today is a matter of paramount importance. Globally, buildings account for almost a third of final energy consumption and are a major source of CO2 emissions. Hotels are the highest energy buildings in the tertiary sector due to their functional characteristics and the large number of users (Bramwell& Lane, 2012). The transition to a less energy-intensive tourism sector seems to be inevitable.

The most important way to save energy in the hotel sector is to take passive and active measures. Passive measures are defined as measures dictated by the bioclimatic design of buildings and assets, while active measures refer to the management and mitigation actions to minimize energy consumption.



Analysis of energy consumption in a typical hotel (Source: International Energy Agency, 2010)

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## Materials - Methods



The hotel is located by the sea and consists of two buildings. For the purpose of its energy upgrade, water heat pumps were installed instead of the existing oil boiler.

The multi-criteria analysis evaluated the three main axes of sustainability based on environmental, economic and social criteria.

Following table lists the evaluation criteria.

	Environmental	Economic	Social
Criterion 1	CO <sub>2</sub> emissions	Construction cost	Users acceptance
Criterion 2	Liquid waste generation	Maintenance cost	Easy to use
Criterion 3	Solid waste generation	Operational cost	Spatial profile
Criterion 4	Recycling after its end of life	Easy to install	Operating and maintenance hazard
Criterion 5	Aesthetics - Visual disturbance	Rehabilitation cost	"Green Tourism"

## Results - Discussion

Indicatively, below is presented after the multi-criteria analysis the results obtained comparing the two examined cases based at the environmental axe.

	Environmental	New heat pump	Old oil boiler
Criterion 1	10	8	7
Criterion 2	9	5	6
Criterion 3	9	10	5
Criterion 4	7	10	8
Criterion 5	8	7	7
<b>RANKING</b>		<b>341</b>	<b>281</b>

## Conclusion

In the environmental axe, the results demonstrated that the application of the new water heat-pump is more prevalent than that of the old oil-boiler.

In contrast, at the economic axe, the oil-boiler is more prevalent as a more economical solution compared to the new heat-pump. However, their difference is not significant.

Finally, in the social axe of sustainability, the heat-pump also prevails.