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## CAN MACEDONIAN HOTELS BE GREEN: THE EVIDENCE OF HOTEL “FLAMINGO” – GEVGELIJA, MACEDONIA

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**A b s t r a c t:** Contemporary tourists are fully aware of numerous environmental concerns the tourism development is facing with, so they have shifted their accommodation preferences towards eco-friendly hotel establishments. They prefer green products and are willing to pay for “green” services. They expect an environmentally responsible hotel to meet their environmental needs and expectations. This provokes a profound modification in the hotel industry which has steadily recognized the necessity for becoming greener in order to be well positioned in the competitive tourism market. The aim of this study is three-folded: (i) To assess the possibility of having “green” hotels in Macedonia, by elaborating the case of hotel “Flamingo” from Gevgelija; (ii) To analyze the level of fulfillment of ecological and energy standards necessary for becoming an environmentally friendly hotel, i.e. eco-hotel; and (iii) To pose some valuable recommendations for boosting the development of eco-hotels in Macedonia. The research is based on interviews with hotel managers at all levels responsible for managing various hotel sectors related to producing green products and services. The study has revealed that this five-star hotel has a positive attitude and perception for becoming an eco-hotel due to its willingness to use energy efficient appliances in order to reduce the energy consumption. In this line, some recommendations are posed in terms of strategies to help reduce negative impacts on high operational costs. These strategies include better isolation of the facility; enhancing and increasing the level of awareness among hotel personnel regarding the benefits that eco-hotels bring; introducing subsidies on local and central level aimed at fulfilling preconditions for running a high energy efficient hotel; and introducing standards and specifications which will lead to application of environmental protection practices and energy efficient concepts in hotels as a strategic priority for further national tourism development.

**Key words:** Green tourism; Eco-hotels; Environmental protection; Energy efficiency; Hotels

## ДАЛИ МАКЕДОНСКИТЕ ХОТЕЛИ МОЖАТ ДА БИДАТ „ЗЕЛЕНИ“: ДОКАЗИ ЗА ХОТЕЛ “ФЛАМИНГО” – ГЕВГЕЛИЈА, МАКЕДОНИЈА

**A п с т р а к т:** Современите туристи претпочитаат „зелени“ производи и се подготвени да платат за т.н. „зелени“ услуги. Основни цели на оваа студија се: (1) да се даде проценка за можноста на развој на “зелени” хотели во Македонија, преку анализа на работењето на хотелот “Фламинго” во Гевгелија; (2) да се анализира нивото на исполнување на валидните еколошки и енергетски стандарди потребни за еден хотел да биде признаен како „зелен“, односно еко-хотел; и (3) да се дадат корисни препораки за унапредување и развој на други еко-хотели во Македонија. Истражувањето се базира на реализирани анкети со менаџерите од различни нивоа на менаџирање на хотелот кои се директно одговорни за управување со хотелските сектори кои во себе вклучуваат создавање и понуда на „зелени“ производи и услуги на гостите. Студијата покажа дека овој хотел со пет ѕвездички има позитивен став и перцепцијата за да стане еко-хотел. Дополнително беше утврдена и неговата подготвеност во секојдневното работење да се користат енергетски ефикасни уреди со цел да се намали потрошувачката на енергија. Во трудот дадени се и некои препораки во однос на примена на проверени стратегии во насока на намалување на негативното влијание кое зголемената потрошувачка на енергија го има врз високи оперативни трошоци.

**Клучни зборови:** „зелен“ туризам; еко-хотели; заштита на животната средина; енергетска ефикасност

### INTRODUCTION

Tourism industry has developed world-wide by spreading its numerous positive impacts. World

globalization, improvement of the air traffic, especially the long-distance flights, modest transportation prices and easiness of the internet-based reservations, provided increased number of opportuni-

ties to travel, not only for leisure as in the past, but even more for business. The boom of tourism industry has brought a huge interest in investing largely, expecting quick repayment and increased profits.

In parallel, the vast majority of tourists who frequently travel all around the globe, have become aware and started considering not only the quality of the lodgings and tourism-related services, but also some quite new and far from ordinary tourist issues, like: environmental protection, waste treatment measures, energy efficiency, usage of renewable energy sources, green-house gas emissions, etc. In general, modern tourists start to seek and would gladly pay more for a “green tourism” or “eco-friendly tourism” rather than just select a simple low-cost ordinary hotel that offers standard services.

In particular, the hotel managers had to rearrange quickly their priorities and to implement various measures to meet guest’s requests in respect of their increased environmental needs. This means starting with education and training of the hotel personnel, followed by step-by-step implementation of a set of measures towards improvement of services, and finally obtaining green or eco-certificates for the business in order to easily cope with the ever growing competition.

On the other hand, the academia and researchers spent a lot of research efforts and published extensively on the investigated subject. So, the issue of application of the renewable energy sources in tourism industry is a relatively well studied area [1–10]. Furthermore, Khemiri and Hassairi<sup>8</sup> along with Kirk [11] argue the necessity of the energy use and the hotel environmental performance. Moreover, number of studies debate the need of always having in mind the environment, thus introducing environmental protection programs in hotel activities in terms of reducing the energy consumption, recycling, composting food scraps etc. [12–15]. All this led to changes in tourists attitudes towards eco-friendly business establishments [16], as well as to modifications in purchase, production and operation processes and procedures resulting with increase for ecological conscious [16, 17]. The previous studies were also focused on the green economy and acceptance of renewable sources of energy [18–21]. Many academics note that hotels have noticed the benefits from improvements into the environmental performance generally by reducing the operational costs [11, 22, 23] and sustaining the competitive advantage and in-

creased demand for eco-friendly hotels [3, 24, 25]. Even more, in some studies was found that tourists prefer much more to consume green products and are willing to pay for eco-friendly services [26–28], rather than for ordinary hospitality services.

This research discusses lengthily the status of Macedonian hotel industry towards the environmental awareness, the implementation of modern environmental standards, and perception on the energy efficiency, as well as the application of renewable energy resources. For that purpose, the analysis is based on the elaboration of the case study of the “Flamingo” hotel complex in Gevgelija, as one of the most representative five-star hotels in Macedonia. The stress is put on assessment of the implemented standards, audit of the hotel business and interviews with employees and hotel managers on various managerial levels. The outcomes revealed that this hotel has already undertaken numerous successful steps to significantly develop the ecological and environmental status of the facility and notably has improved the energy efficiency of the business. Furthermore, the study concluded that the “Flamingo” hotel complex considers to makes serious investments in future in order to obtain some of the widely renowned eco-certificates for hotel business.

## RESEARCH BACKGROUND

### *Hotel Complex “Flamingo” – Gevgelija*

The “Flamingo” hotel complex is located just outside the city of Gevgelija, in the southeastern part of Macedonia, near the Macedonian-Greek border. The complex covers an area of over 30,000 m<sup>2</sup> with more than 12,000 m<sup>2</sup> construction area and has been operational since 2005. It comprises of a casino, a five-star hotel with a nightclub, a penthouse, several superb level restaurants and a wide choice of bars. The hotel offers spacious and architecturally well-designed 41 luxury rooms, 11 business suites, 6 super-exclusive apartments and special rooms for disabled guests. The hotel also has a modern spa center and hydrotherapy massage, a fitness center, a hair salon, manicure and pedicure and a salon for cosmetic treatment.

### *Research Tasks and Aims*

The main task in the research was to answer the following questions: Whether and to what extent the hotel managers in the hotel complex “Fla-

Flamingo" implement the environmental and energy efficiency standards? Do they possess enough knowledge and capabilities for enforcing the eco-standardization in their daily hotel operations?

The research methodology was divided into several segments including personnel surveys and interviews with the managers on several executive levels, field work and audit of the daily operation of the hotel facility, as well as analysis of the obtained results of the already taken measures for energy efficiency improvements. The surveys covered several important business fields such as: implementation of the HACCP system, day-to-day hotel operation and maintenance, housekeeping and laundry, purchase of food, drinks and other goods and services, running of the kitchen, restaurants and bars, energy efficiency and reduction of energy related expenditures, inclusion of renewable energy resources, etc.

Using the "Flamingo" hotel complex as a role model, the expected outcome of this research was to estimate the present environmental awareness in the five-star hotel industry in Macedonia, along with the necessity for defining a new standard level that has to be followed by other hotels in the line of obtaining a "green" or "eco-friendly" label or certificate. Additionally, the intention was to estimate the expected investments which were part of this eco-friendly labeling process as well as the expected benefits for a particular hotel individually and possibly for the hotel industry in Macedonia in general.

### *How "green" is enough green*

In its earliest phase, the term "green hotel" was related to several more or less today well known activities, such as a regular daily replacement of the linens and towels with occasional replacement in accordance and cooperation with the hotel guests, re-setting the toilets flush and bath taps to spend less water, using additional room lightings instead of a single central main light, recycling some of the hotel amenities or used goods, or even a modest utilization of renewable energy resources, especially for heating water. Today, all of the above mentioned measures are absolute minimum that any real "green hotel" must fully respects.

In addition to these activities, today's modern "green" or "eco-friendly" hotel must apply some measures for energy savings through the use of renewable energy, usage of bio-gradable cleaning

products, natural materials, an offer of organically-grown food and drinks and do recycling for all products and goods starting from their office supplies up to the waste oils in the kitchen, batteries, used lamps, TV or and other electric appliances in the hotel. The rooms, by definition have to be "smart" and be able to provide full control and regulation of the energy consumption, heating and cooling system (HVAC), utility of efficient lightings and to have full security control over the guests regardless they are in or out of the room.

The analysis of the average energy use in the hotel divided into segments is shown in Figure 1. It gives an idea where the focus of all activities for energy efficiency increase should be placed. The point which can be seen is that only four hotel activities such as heating, cooling, hot water production and lightings on average spent more than 60% of the entire hotel energy needs. Obviously, the major savings should be concentrated on the efficient usage of energy and utilize any possible way for energy savings in these areas.

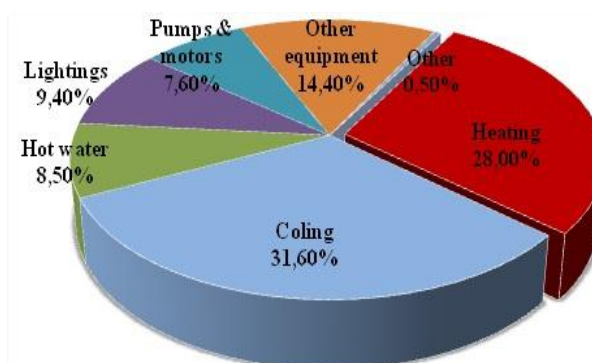


Fig. 1. Energy use in hotel "Flamingo" divide by segments

However, being "green" does not stop here. The hotel facilities with good "green" story always go a step further. Their employees have uniforms made of environmentally friendly material, guests have the opportunity to buy a number of eco-friendly products as souvenirs and even complete public procurement within the hotel is determined by the principle: *more environmentally acceptable, rather than cheap*.

Hotels which operate in accordance with these principles are often certified as "green". There are numerous certificated companies which deal with this type of eco certification of such hotels with an assortment of more or less global eco-certificates or eco-labels. To aid in these matters, if some hotel as a whole facility does not fulfill certain "green" practices and could not qualify for

obtaining any particular global eco-certificate, partial certification is also possible, moving step-by-step. For example first happens the certification only for the kitchen or one particular restaurant within the hotel complex, followed by a certification for eco recycling and disposal of hazardous goods, then implementation of energy efficient measures, waste and sewage water treatment, etc., and finally finishing with a certification of the employees as so-called "*green ambassadors*."

#### *Eco-hotels and Eco-tourism*

Despite the already affirmed wellness, family, heritage, eno-gastro, ethno, business hotels, hotels for active holidays, etc. over the recent years the so-called eco-hotels have become a real tourism hit. Eco-hotels are usually defined as hotel facilities that provide synergy between their operation and services and the full harmony of the nature. A hotel labelled as "*eco*" is actually a classic hotel which differs in that manner that the management team and its employees have an obligation about all their operational activities, starting from daily activities and ending with their long-term decision makings. Their conduct is also guided by the principle of having least harmful impact on the environment and the best impact on the community. Such a commitment means understanding the impact their hotel has on the local environment at all levels, as well as the removal or mitigation of any potential adverse impacts that their business could have on the environment. In general, this kind of business operation is considered to be community responsible behavior or sustainable business operation.

In fact, this is only a part of the mandatory mode of operation, which perhaps more than any others requires systematic and quality education for the employees. For example, the staff working in maintenance must be familiar with the numerous procedures related to daily check of the efficiency of the hotel system and its consumption – from heating, electricity, water, forest waste, work washing, to the tiniest elements that guests have come to expect in such hotels. Therefore, we believe that continuous education of the employees is one of the most important tasks for a successful operation of such "*green*" hotels, and this is the field where the major investment has to be directed for future eco-hotel managers, especially in Macedonia.

#### **HOTEL COMPLEX "FLAMINGO" AS A ROLE MODEL FOR ECO-HOTELS**

As mentioned above, the initial intention was to investigate the ecological standards applied in the hotel complex "Flamingo". We compared these ecological standards with the contemporary international ecological standards, and selected those already implemented which fully comply with renowned international standards. Finally, on one hand we estimated the benefits brought by that implementation to the operational costs of the hotel, and on the other hand, used those standards as a model for other high category hotels in Macedonia to develop general national eco-hotel standards.

#### *Selection of the standardization criteria*

Several years ago, the top management of the hotel complex "Flamingo" decided to work towards obtaining a "*green*" hotel or eco-friendly label certificate. For that purpose, they selected a set of the most important certification criteria. Those criteria were divided into several groups according to their similarities, such as:

#### ***Energy efficiency measures and clean energy resource***

- Adequate selection and combination of energy resources (fossil fuels and renewable);
- Energy efficiency of water heaters (boilers);
- Energy efficiency of the central cooling system (chillers);
- Thermal insulation of all hotel facilities;
- Hotel heating and air-conditioning systems;
- Lighting (main and additional);
- Utilization of efficient light bulbs; and
- Control of the working hours of sauna and other spa facilities.

#### *Efficient use of water resources*

- Use of efficient toilet flushes and taps;
- Protection of water sources and water savings;
- Adjust the water flow in taps and showers;
- Avoiding any possible water linkage;
- Change of towels and bedding;
- Watering the flowers and grass; and
- Cleaning of waste-water and sewage water.

#### ***The use and disposal of hazardous materials and chemicals***

- Utilization of bio-degradable cleaners;
- Use of disinfectants;

- Working with hazardous materials; and
- Permanent education of the hotel staff for appropriate way of handling hazardous materials, disinfectants, cleaners and detergents.

### **Waste Management**

- Waste selections by the staff and the guests;
- Treatment of the hazardous waste;
- Collection of waste in the rooms and bathrooms; and
- Appropriate treatment of any other municipal waste.

### **Hotel management**

- Operation and maintenance of air conditioning and other servicing equipment;
- Maintenance and servicing of boilers and heaters and piping;
- Staff training; and
- Promoting public transport.

### **Policy for environmental protection**

- Establishing policy for environmental protection with an action plan;
- Appointing responsible persons;
- Recording and archiving; and
- Educating and informing staff.

### **Introduction of "smart" or "intelligent" hotel rooms**

The term "smart" or "intelligent" hotel room means use of microprocessor operated and controlled station that monitors all parameters important for normal functioning of a single hotel room or a group of hotel rooms. In general, it includes the supervision of the room temperature, guests input/output, alarms, etc. For achieving higher efficiency, these stations are usually connected to a single centralized computer, which provides centralized control of the entire floor, wing or even the entire hotel. With implementation of the concept of "intelligent" rooms in the hotel "Flamingo", the following objectives are accomplished:

- Significant reduction of energy and water consumption;
- Reconcilable and smooth operation of all devices in the room;
- Maximum convenience and comfort for the guests;
- Increased reliability, security and quality of the hotel stay for the guests;

- Increase staff efficiency due to the continuous reception of on-line information; and
- Development of increased "environmental awareness" among guests and employees.

Except for administrative tasks, the computer system installed in the hotel is also used for managing and supervision of all hotel operations. It has been proven that an investment in these new technologies (e.g. HVAC system) quickly pays off, both financially and by increasing the reliability and quality of the provided hotel services. Setting the HVAC system is very straightforward. Usually, it is based on a fuzzy logic and depends solely on the presence of the guest in the room and their wishes and needs.

An example of automation settings of the HVAC system installed in the "smart" rooms of the hotel "Flamingo" is given in Table 1. As it can be seen, when the room is available, i.e. unoccupied, only the refrigerator is operational, while after occupying the room, the settings of the room temperature and operation of the appliances become subject to guests' desires.

Table 1

### *Automation of HVAC system*

Room status	Status of the HVAC System
Room is available	(Anti-frost mode) Only the refrigerator from the mini bar is in function.
Room is occupied, but the guest is outside the room	(Economy mode) The refrigerator is in function, room temperature is set 3°C lower than the outside temperature. If the window is open, the HVAC system does not operate.
Room is occupied, and the guest is inside the room	(Comfort mode) All functions ( <i>temperature, air-flow, etc.</i> ) within the room may be set by the guest. If the window is open, the HVAC system does not operate.

Three separate operation modes are available, *anti-frost mode*, *economy mode* and *comfort mode*, which fully satisfy, on one hand the needs of the guests, and on the other hand they provide sustainable energy savings for the entire hotel. In addition to the heating and cooling regime, the "smart" rooms also enable some energy savings due to the various lighting modes, such as, all lights out for unoccupied and/or empty room, to full selective main and additional lightings when the guest is in his/her room. Finally, if the window or balcony door is left open, the whole air conditioning system

goes off for additional energy savings. All hall lights have motion sensors and they go on only if these sensors detect movements in the hall, otherwise, the hall lights are permanently off.

Obtained room data is transferred into the main computer where at any time the operators can get the whole picture of the events in the hotel. Figure 2, shows the computer monitor for the first floor of the hotel “Flamingo” with the obtained data for each room.

Beside energy savings, these “smart” rooms provide high security and comfort for the guests by

implementation of the so-called monitoring and supervision system. This system is based on the use of smart cards for opening the room door. These cards can have two options: “read”, or “read & write.” The “read” card can be used only for opening the room door and setting the control system within the room on. The “read & write” cards in addition to the above services, generate a computer log file where all activities for that particular room such as “when”, “who”, “how”, etc. are logged, monitored, and later even analyzed.

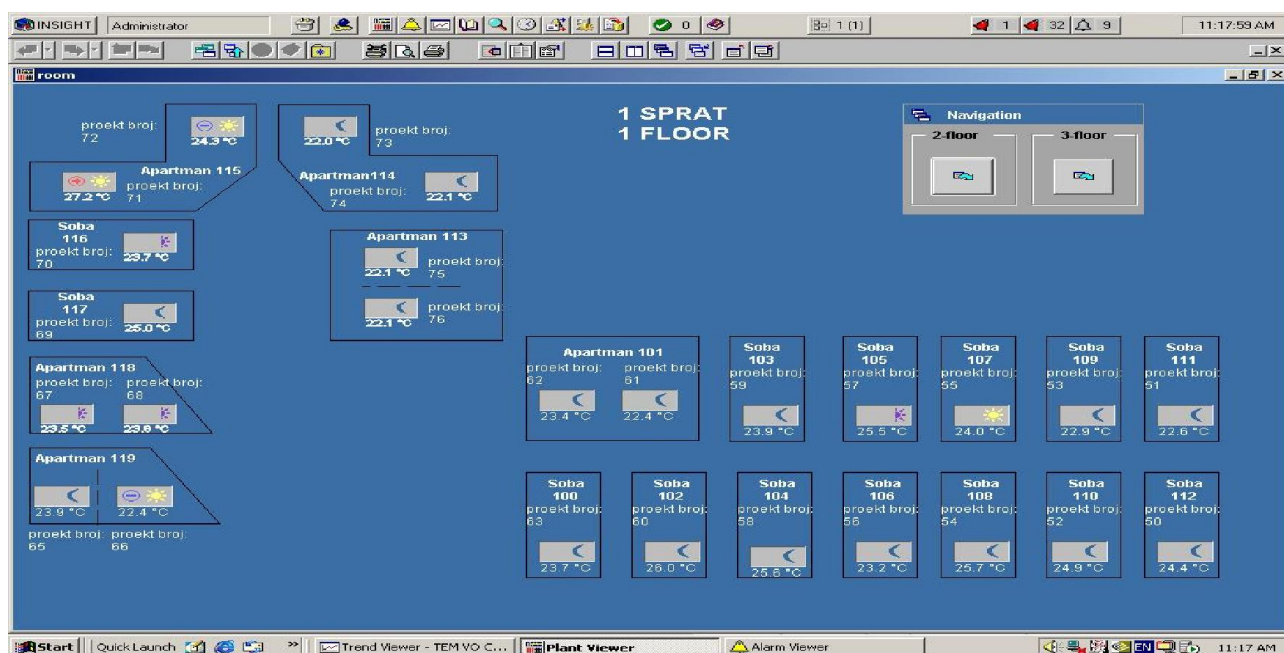


Fig. 2. A snapshot of the HVAC monitoring system at hotel “Flamingo”

Additionally, the smart card system supports several categories of inputs, such as:

- Guest, maid, waiter, maintenance and management;
- Room entry with a contactless card;
- Supervision of the room’s front door, with alarm for unauthorized entry;
- Signaling the presence of the guest in the room;
- Various alarms, such as SOS alarms in bathrooms, rooms, common areas; etc.

#### *Investments and expected repayment period*

Before discussing the obtained benefits of the implementation of various energy efficiency measures and introduction of the “smart” room concept at hotel “Flamingo”, we feel that a simple investment analysis should be done in respect to the

invested funds and expected benefits, cost savings and repayment periods. A simple pre-investment analysis to justify the needs of new investments in implementation of environmentally and energy-friendly measures was carried out. The proposed measures were divided into three groups, based on the implementation time, such as: *the short time measures* (amendment of thermostatic valves, replacement of showers’ heads, temperature adjustment, etc.), *the medium term measures* (installing thermal solar systems for production of hot water, replacement and/or modernization of mixing valves and pumps, replacement of boilers, insulation of the water pipes, etc.), and *the long term measures* (installation of photovoltaic system, installation of new energy efficient facades on the building, etc.). The results of this pre-investment analysis are given in Table 2.



Table 2  
*Pre-investment analysis*

Type of taken measures	Investment recovery (years)	Energy savings (%)	Cost savings (per year) (€)
Short term measures	< 5	25	6,000
Medium term measures	> 5	37	10,000
Long term measures	> 10	70	20,000

*Effects of short term measures and introduction of "smart" rooms*

To show that introduction of a "smart" room at the hotel "Flamingo" can result in substantial energy savings, and to fully justify the investment in the new HVAC system, in cooperation with the hotel management, some measurements were carried out for the period of only four months (October 2011 – January 2012). The measurements were conducted using two identical rooms; Room A where all functions provided in the HVAC system were enabled, while in the other room, Room B all

HVAC functions were blocked. The energy savings were monitored, mostly as a result of various temperature adjustments in the rooms depending on the room status (unoccupied room, guest in the room, guest out of the room, etc.). The comparison of the obtained results for both rooms is shown in Table 3.

According to the presented data, one can see that in case of the unoccupied room, the spent energy was 74.61% less for the room with installed HVAC system compared with the room without HVAC system, while in the case of occupied rooms, the energy savings are lower, but still significantly high, at the level of 15.67% savings. These results show that investments in a HVAC intelligent system could rapidly repay its investment by reducing the operational cost spent only for energy, not mentioning the improvement of the quality of the guests' accommodation. If this test had been done for a longer period and for different types of room, various guests, various occupancy rates, etc., even better energy saving results could have been obtained.

Table 3

*Comparison of the obtained measured results for a room with fully functional HVAC intelligent system (Room A), and a room with HVAC system blocked (Room B).*

Month	October		November		December		January		Total	
Room	A	B	A	B	A	B	A	B	A	B
Energy consumption (room is occupied)	712	816	661	773	749	886	891	1098	3013	3573
Energy savings (B-A)/B (%)	-12.75		-14.49		-15.46		-18.85		-15.67	
Energy consumption (room is unoccupied)	72	272	31	78	70	298	75	369	248	1017
Energy savings (B-A)/B (%)	-73.53		-60.26		-76.51		-79.67		-75.61	

According to some other tests done by other renowned hotel brands similar or even better results could be seen. For example, a similar analysis has been done by the hotel brand Holiday Inn in Madison, USA. The so-called *GREM – Guest Room Energy Management system*, was installed in their 110 rooms and the same was tested. The results showed that for the testing period of only nine months (January – September 2006), they saved 381,908 kWh, which amounted more than 100% of the annual electricity consumption of the same hotel for the entire previous year in the amount of 378,673 kWh, or they were able to save more than \$24,000 USD<sup>29</sup>. Even more, decreasing the room temperature for only 1°C on average could lead to energy savings up to 6%, which in case of large

hotel facilities could be significant drop-down of the overall operational cost [30].

Other significant energy and cost savings in the hotel industry could be expected in the air-conditioning and air quality systems improving facilities. It is well-known that there are more than 1,500 various bacteria, viruses and fungi that live in the air-conditioning units. Therefore, constant cleaning and proper maintenance of such devices is crucial for providing quality and clean environment for the hotel guests in their rooms and in other hotel facilities such as restaurants, bars, spa and fitness areas, children playgrounds, disco-clubs, casinos, or anywhere the guests spend most of the time during their hotel stay. The hotel "Flamingo" pays special attention to air-condition sys-

tems and their clearness. For monitoring and control of the air-conditioning system, at hotel “Flamingo” a special software tool is installed as shown in Figure 3. Using this software tool, the management of the hotel can take serious and timely measures to protect the health of the guests by means of regular periodical maintenance, at least once a month, for all filters of split systems, air handling pipes and electrostatic cleaners in full compliance with the appropriate ISO standards.

The software also keeps records and documentation on all activities undertaken in connection with it. Therefore, the energy savings should not always be treated as compulsory, especially where the health and well-being of the hotel guests is of priority issue. Having “green” hotels means having the best on all levels not only savings in the operational cost, but also providing healthy environment and pleasure for the guests.

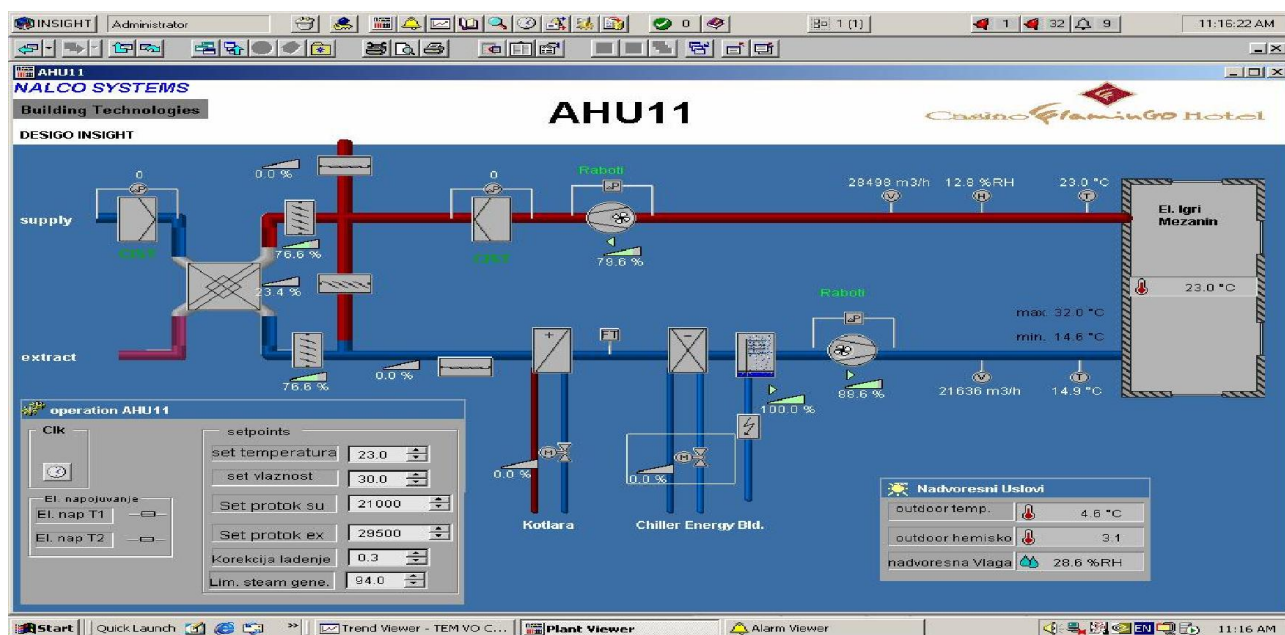


Fig. 3. AirConditioning system control software at hotel “Flamingo”

Finally, the measures implemented in the hotel “Flamingo” in respect of water savings, especially hot water savings, are discussed. Hotels are large consumers of hot water. They use hot water on all levels, not only for the guests, but also in the kitchen, for cleaning, washing and ironing, indoor pools, spa and fitness centers, etc. Therefore, any hot water savings, even on a small scale could have a huge operation cost effect. A study done by the bathroom equipment producer *Ideal Standards*<sup>31</sup> shows that the type of water taps and shower systems used in the bathrooms could have huge influence on the amount of water expenditures and lowering the operational costs. Based on the total number of rooms in a hotel, the savings could be measured in thousands of Euros annually. The data are presented in Table 4.

This data was compared with the data obtained from the hotel “Flamingo”. Since this hotel has 60 rooms, and its average occupancy rate is 80%, then the number of annual showers is esti-

mated at 12,000. If the average shower time is 5 min, and the price of the water for heating and waste disposal is 4.6 EUR/m<sup>3</sup> while the cold water price is 0.46 EUR/m<sup>3</sup>, the price per shower could be estimated as 0.76 EUR for non-mixing (two-handle) taps, 0.69 EUR for mixed-valve taps, and 0.32 EUR for thermostatic mixed-valve taps. Therefore, the savings per shower are estimated at 0.07 EUR and 0.44 EUR for using mixed-valve and thermostatic mixed-valve taps instead of ordinary two-handle non-mixed valve taps. Consequently, the expected savings would be  $(12,000 \times 0.07) = 840$  EUR when two-handle taps could be replaced with mixed-valve taps, up to  $(12,000 \times 0.44) = 5,280$  EUR when new thermostatic mixed-valve taps could be installed. As it can be seen, these results correspond with the data given in Table 4. At present, the management of the hotel “Flamingo” has replaced all two-handle taps with mixed-valve taps, with a future plan all of them to be replaced with thermostatic mixed-valve taps.



Table 4

*Average annual water & energy consumptions and savings depending on the bathroom taps type*

Number of rooms	Number of taken showers annually	Non-mixed tap (two-handle tap)	Cost (€) Mixed-valve tap	Thermostatic mixed-valve tap
20	5,840	4,420	4,001	1,851
Savings			419	2,569
50	14,600	11,048	10,003	4,628
Savings			1,045	6,420
100	29,200	22,096	20,006	9,256
Savings			2,090	12,840
200	58,400	44,192	40,012	18,513
Savings			4,180	25,679
300	87,600	66,287	60,017	27,769
Savings			6,270	38,518

#### EXPECTED FUTURE ACTIVITIES AND IMPROVEMENTS

To be a "green" hotel today is not a question of fashion but rather a question of survival especially in renowned tourist destinations such as Italy, Spain, France, Greece, Thailand, Switzerland, Hawaii, etc. Macedonia has a strategic aim to improve its tourism supply and to increase the annual revenues from tourism. For the past several years, the number of tourists visiting Macedonia increased dramatically mostly as a result of intensive campaigns, promotions at international tourism fairs, TV, magazines and other media commercials. However, this positive trend could not last long if hotels do not follow the modern trends and standards specifically by investing in environmentally friendly hotels and tourism services. Furthermore, the eco-labeling and eco-certification of hotel establishments, as well as the education and training of the employees in terms of the environment protection, utilization of organic food, usage of renewable energy sources, the increase of energy efficiency and large penetration of sophisticated information technology at any level, is a priority to Macedonian hotel industry.

Application of all of the above mentioned, actually leads to implementation of a new and modern concept called "smart hotel" concept. This new concept means totally new and enhanced level of accommodation that might be offered to the guests, which satisfies even the highest standards

in hotel industry. An example of a "smart hotel" concept is schematically presented in Figure 4. It is noticeable that this new hotel standard possesses a huge technical capability to capture the guests' interest - from the time they step into the lobby, to the time they leave the hotel.

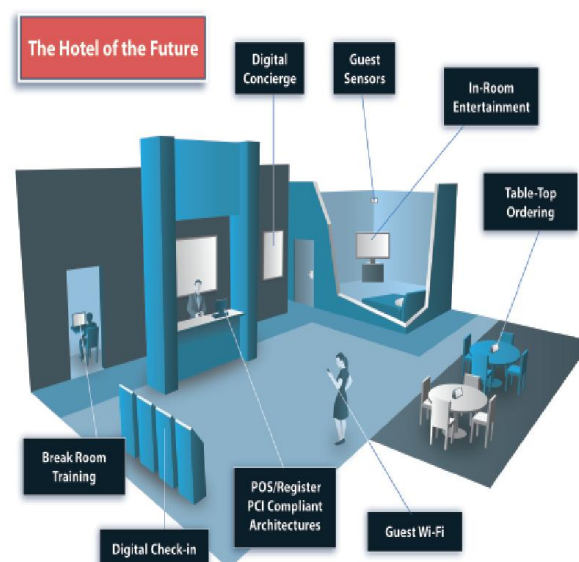


Fig. 4. The "smart" hotel from the future

Starting from the lobby and registration desk, restaurants and bars, a full high-speed Wi-Fi Internet connection in all facilities is considered as a must. Each guest should freely enjoy using automatic check-in and check-out, digital concierge and restaurants with specially designed POS termi-

nals where the guest can automatically set their food and drink preferences, eating time and table selection, variety of room and hotel entertainments, all other hotel services, video-surveillance, etc. This new concept of the hotel industry gradually becomes available.

## CONCLUSION

The study gives a brief overview of the present status of the hotel industry in Macedonia, with a special accent on the environmental awareness. The key investigated issue was: how “green” are Macedonian hotel facilities by elaborating the case of the hotel complex “Flamingo” in Gevgelija, as one of the best positioned five-star hotels in Macedonia. By means of several methodological approaches, such as literature review, survey and interview with the hotel management, the field work and direct hotel audit, the study concludes that the “green” hotel concept is not unknown in Macedonian hotel industry. However, mostly as a result of long already established practices, not enough staff education and lack of suitable investments, many hotel managers are conservative and reluctant when considering the issue of further investments in environmentally beneficial programs and the improvements of the eco-friendly appearance of their hotel facility.

However, there is positive experience gained from the hotel “Flamingo” especially in the area of cost reduction based on the energy efficiency measures already taken, the implementation of “smart” room concept, the treatment of the waste water and garbage, hot water savings, etc. It also presents a valuable step forward towards the application and achievement of eco-labeling of the hotel. Some additional steps should be taken, particularly in the field of better and larger level of utilization of renewable energy sources, e.g. solar energy which is excessive at this location, not only for water heating, but also for self-sustained production of electricity using the hotel and parking rooftops. Eventually, according to the guest requests and the available funds, the management of the hotel is strongly motivated to enter into the modern “smart” hotel era in the future.

What is most relevant is that other hotels in Macedonia should follow and closely monitor the current ecological improvements implemented in the hotel “Flamingo” in the line of implementation realised in their facilities. It is also important to

initiate some development of national standards in respect to these issues, and to enforce them in tourism industry by the official policy makers, such as the Ministry of economy or the Tourism Chamber of commerce. Hence, the hotel industry in Macedonia will be enhanced resulting into higher competitiveness. Finally, the study recommends that the key-tourism players should necessarily create preconditions for further improvements of tourism and hospitality sector, generally by spending more efforts, time and investments for developing modern and highly sophisticated hotel facilities in the near future.

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