



# PROCEEDINGS



26th  
International  
Conference  
*Ecological*  
Truth and  
Environmental  
Research

**EDITOR**

*Snežana Šerbula*

12-15 June 2018, Hotel Jezero, Bor Lake, Serbia

**PROCEEDINGS**

**26<sup>th</sup> INTERNATIONAL CONFERENCE**

**ECOLOGICAL TRUTH AND ENVIRONMENTAL RESEARCH – EcoTER'18**

**Editor:**

**Prof. dr Snežana Šerbula**

*University of Belgrade, Technical Faculty in Bor*

**Technical Editors:**

**M.Sc. Jelena Milosavljević**

*University of Belgrade, Technical Faculty in Bor*

**Doc. dr Ana Radojević**

*University of Belgrade, Technical Faculty in Bor*

**Publisher:** University of Belgrade, Technical Faculty in Bor

**For the Publisher:** Dean Prof. dr Nada Štrbac

**Printed:** 130 copies

ISBN 978-86-6305-076-1

CIP - Каталогизacija у публикацији - Народна библиотека Србије, Београд

502/504(082)

613(082)

INTERNATIONAL Conference Ecological Truth and Environmental Research (26; 2018; Bor)

Proceedings / 26th International Conference Ecological Truth and Environmental Research, 12-15 June 2018, Hotel Jezero, Bor Lake, Serbia;

[organized by University of Belgrade, Technical Faculty in Bor (Serbia)];

editor Snežana M. Šerbula. - Bor : University of Belgrade, Technical

faculty, 2018 (Bor : University of Belgrade, Technical faculty). - XXI,

483 str.: ilustr. ; 21 cm

Tiraž 130. - Str. XIII: Preface / Snežana Šerbula. - Bibliografija uz svaki rad. - Abstracts. - Registar.

ISBN 978-86-6305-076-1

1. Шербула, Снежана, 1958- [уредник] 2. University of Belgrade, Technical faculty (Bor)

а) Животна средина - Заштита - Зборници б) Здравље - Заштита - Зборници

COBISS.SR-ID 264711692

**26<sup>th</sup> International Conference  
Ecological Truth and Environmental Research 2018**

**is organized by:**

**UNIVERSITY OF BELGRADE, TECHNICAL FACULTY IN  
BOR (SERBIA)**

**Co-organizers of the Conference:**

**University of Banja Luka, Faculty of Technology  
– Banja Luka (B&H)**

**University of Montenegro, Faculty of Metallurgy and Technology  
– Podgorica (Montenegro)**

**University of Zagreb, Faculty of Metallurgy  
– Sisak (Croatia)**

**Society of Young Researchers – Bor (Serbia)**

---

### HONORARY COMMITTEE

---

Prof. dr Stevan Stanković, UB GF (Serbia)  
Dr. Petar Paunović, Zaječar (Serbia)  
Prof. dr Zvonimir Stanković, Bor (Serbia)  
Prof. dr Ladislav Lazić, UZ Sisak (Croatia)

---

### SCIENTIFIC COMMITTEE

---

Prof. dr Radoje Pantović, UB TF Bor, *President*  
Prof. dr Nada Štrbac, UB TF Bor, *Vice President*  
Prof. dr Snežana Šerbula, UB TF Bor, *Vice President*

---

### INTERNATIONAL COMMITTEE

---

Prof. dr Hami Alpas (Turkey)	Prof. dr Helena Prosen (Slovenia)
Prof. dr Gerassimos Arapis (Greece)	Prof. dr Svilen Ratchev (Bulgaria)
Prof. dr Jan Bogaert (Belgium)	Prof. dr Cipriana Sava (Romania)
Prof. dr Mladen Brnčić (Croatia)	Prof. dr Slavica Sladojević (B&H)
Prof. dr Ladislav Lazić (Croatia)	Prof. dr Petr Solzhenkin (Russia)
Prof. dr Aleksandra Nadgórska-Socha (Poland)	Prof. dr Natalia Shtemenko (Ukraine)
Prof. dr Natalija Dolić (Croatia)	Prof. dr Nada Šumatić (B&H)
Prof. dr Nenad Stavretović (Serbia)	Prof. dr Barbara Tora (Poland)
Prof. dr Rodica Caprita (Romania)	Prof. dr Darko Vuksanović (Montenegro)
Prof. dr Risto Dambov (Macedonia)	Prof. dr Jacques Yvon (France)
Dr Kremena Dedelyanova (Bulgaria)	Prof. dr Dejan Filipović (Serbia)
Prof. dr Genc Demi (Albania)	Prof. dr Predrag Jakšić (Serbia)
Prof. dr Zoran Despodov (Macedonia)	Prof. dr Đorđe Janačković (Serbia)
Prof. dr Antonello Garzoni (Italy)	Prof. dr Željko Kamberović (Serbia)
Dr Irena Grigorova (Bulgaria)	Prof. dr Slaviša Putić (Serbia)
Prof. dr Seref Gucer (Turkey)	Prof. dr Zoran Milošević (Serbia)
Prof. dr Svetomir Hadži Jordanov (Macedonia)	Prof. dr Maja Nikolić (Serbia)
Prof. dr Violeta Holmes (UK)	Dr Nina Obradović (Serbia)
Prof. dr Slavomir Hredzak, (Slovakia)	Dr Miroslav Pavlović (Serbia)
Prof. dr Rajko Igić, (USA)	Prof. dr Ivica Radović, (Serbia)
Prof. dr Totyo Iliev (Bulgaria)	Prof. dr Vesela Radović (Serbia)
Prof. dr Milovan Jotanović, (B&H)	Prof. dr Ivica Ristović (Serbia)
Dr Florian Kongoli (Canada/USA)	Dr Jasmina Stevanović (Serbia)
Prof. dr Artem Kolesnikov (Russia)	Dr Dejan V. Stojanović (Serbia)
Dr Marius Kovacs (Romania)	Dr Mirjana Stojanović (Serbia)
Prof. dr Ivan Krakovsky (Czech Republic)	Prof. dr Marina Stamenović (Serbia)
Prof. dr Jakob Lamut (Slovenia)	Prof. dr Nada Štrbac (Serbia)
Dr Marcin Lutinsky (Poland)	Prof. dr Dejan Tanikić (Serbia)
Dr Borislav Malinović (B&H)	Prof. dr Milan Trumić (Serbia)
Prof. dr Konstantinos Matis (Greece)	Prof. dr Snežana Šerbula, (Serbia)
Prof. dr Marius Miculescu (Romania)	Prof. dr Mile Dimitrijević (Serbia)
Prof. dr Mirela Mazilu (Romania)	Prof. dr Snežana Milić (Serbia)
Prof. dr Ivan Nishkov (Bulgaria)	Prof. dr Mirjana Rajčić Vujasinović (Serbia)
Prof. dr Adila Nurić (B&H)	Prof. dr Miodrag Žikić (Serbia)
Prof. dr Samir Nurić (B&H)	Prof. dr Maja Vukašinović-Sekulić (Serbia)
Prof. dr Guven Onal (Turkey)	Prof. dr Nenad Vušović (Serbia)
Prof. dr Jelena Šćepanović (Montenegro)	Prof. dr Jim Yip (UK)

---

### PROGRAM COMMITTEE

---

Prof. dr Snežana Šerbula, UB TF Bor  
Prof. dr Snežana Milić, UB TF Bor  
Prof. dr Mile Dimitrijević, UB TF Bor  
Prof. dr Milan Antonijević, UB TF Bor  
Dragan Randelović, Spec. MBA

---

### ORGANIZING COMMITTEE

---

Prof. dr Snežana Šerbula, <i>President</i>	Doc. dr Maja Nujkić
Prof. dr Radoje Pantović, <i>Vice President</i>	Doc. dr Ana Radojević
Prof. dr Snežana Milić, <i>Vice President</i>	Doc. dr Žaklina Tasić
Prof. dr Mile Dimitrijević	MSc Jelena Kalinović
Prof. dr Miodrag Žikić	MSc Jelena Milosavljević
Prof. dr Jovica Sokolović	MSc Jelena Ivaz
Prof. dr Marija Petrović Mihajlović	MSc Dragana Medić
Doc. dr Saša Stojadinović	MSc Predrag Stolić
Doc. dr Dejan Petrović	MSc Boban Spalović
Doc. dr Tanja Kalinović	MSc Ivan Đorđević
Doc. dr Ana Simonović	Mara Manžalović, prof. engl.
Doc. dr Milan Radovanović	Enisa Nikolić, prof. engl.

<b>Predrag Stolić, A. Peulić, D. Tanikić</b>	
SOFTWARE DEVELOPMENT FOR THERMOVISION APPLICATION IN TRIAGE PROCEDURES OF EMERGENCY CONDITIONS	379
<b>Agriculture: Nutrition, Organic Food and Health Impacts</b>	
<b>Rodica Caprita, A. Caprita</b>	
ANALYTICAL METHODS USED TO EVALUATE WHOLE MILK QUALITY	385
<b>Adrian Caprita, R. Caprita</b>	
EVALUATION OF FUNCTIONAL PROPERTIES OF SOME BREAKFAST CEREALS	391
<b>Martina Mezei, A. Popović, M. Petrović, T. Stojanović, E. Šnur-Haračić, A. Petrović, V. Bursić</b>	
BIOLOGICAL ACTIVITY OF ESSENTIAL OILS ON THE <i>Tribolium confusum</i> (Coleoptera, Tenebrionidae) ADULTS	396
<b>Alternative Energy: Efficiency and Environmental Policy</b>	
<b>Biljana Petrevska, M. Serafimova, V. Cingoski</b>	
MANAGING SUSTAINABLE TOURISM AND HOTEL INDUSTRY IN MACEDONIA: ENERGY RESOURCES STRATEGIC APPROACH	401
<b>Greenhouse Effect and Global Climate Change</b>	
<b>Aleksandra Ćurčić</b>	
TYPES OF SMART GLASSES AND THEIR USE IN ARCHITECTONIC DESIGN OF ENERGY EFFICIENT BUILDINGS	408
<b>Jelena Ivaz, S. Kalinović, D. Petrović, D. Tanikić</b>	
ENERGY EFFICIENCY ANALYSIS OF THE MINING DEPARTMENT BUILDING – TECHNICAL FACULTY IN BOR	415
<b>Sustainable Development and Green Economy</b>	
<b>Vlatko Cingoski, B. Petrevska</b>	
A NEW LONG-TERM SUSTAINABLE PUBLIC TRANSPORTATION SYSTEM FOR THE CITY OF SKOPJE	422
<b>Marija Stamenković, Lj. Stojčić, S. Glišović</b>	
REGENERATIVE DESIGN AS AN APPROACH FOR BUILDING PRACTICE IMPROVEMENT	429
<b>Nikola Dimitrov, B. Petrevska, M. Serafimova</b>	
ECOTOURISM CERTIFICATION PROGRAMS: MANAGING FINANCING	436
<b>Cipriana Sava, G. Pinteală</b>	
SUSTAINABLE CITIES – ALBA IULIA, ROMANIA	442
<b>Nikola Dimitrov, T. Boshkov, D. Joshevski</b>	
CHALLENGES OF TOURISM BUSINESS IN CONTEMPORARY WORLD	450
<b>Marija Magdincheva–Shopova, T. Angelkova–Petkova, S. Savic</b>	
GREEN ENTREPRENEURSHIP AND SUSTAINABLE DEVELOPMENT OF TOURISM IN THE SOUTHEAST REGION OF THE REPUBLIC OF MACEDONIA	457

## MANAGING SUSTAINABLE TOURISM AND HOTEL INDUSTRY IN MACEDONIA: ENERGY RESOURCES STRATEGIC APPROACH

Biljana Petrevska<sup>1\*</sup>, Mimoza Serafimova<sup>1</sup>, Vlatko Cingoski<sup>2</sup>

<sup>1</sup>University "Goce Delcev", Faculty of Tourism and Business Logistics, Stip, MACEDONIA

<sup>2</sup>University "Goce Delcev", Faculty of Electrical Engineering, Stip, MACEDONIA

\*biljana.petrevska@ugd.edu.mk

### Abstract

*The study is focused on presenting some insights into the use of energy in the hotel industry in Macedonia. It aims at providing an assessment of managerial perception of energy resources and discussed more environmentally compatible and sustainable alternatives. The data were collected by means of an online survey conducted among hotel managers and department supervisors. The summarized results point that the problem is a substantial gap that exists between managerial awareness for the benefits of the renewable energy, and the daily practice of hotels. The study recommends that hotels should create specific strategies that will have a significant impact on reducing energy consumption. Some aspect of these strategies may include increasing the level of awareness among hoteliers through a direct and well-designed environmental protection campaign. Furthermore, to develop and introduce a wide range of energy efficient practices in the first line by introducing some renewable sources of energy. Finally, the paper argues that extraordinary luxury and sustainability are not mutually exclusive by presenting some sustainability best practices of worldwide applied standout environmental programs.*

**Keywords:** Sustainability, Hotel management, Strategic development, Energy, Tourism

### INTRODUCTION

The hotel sector is energy-intensive and makes tourism a substantial contributor to negative impacts on the environment. This requires new technologies that will enable hotels to use cleaner and cheaper energy sources, thus assisting in reducing operational costs and increasing competitiveness and sustainability. Yet, adopting sustainable policies is no longer a simple trend, but it becomes a necessary reality. So, wasting less food, saving energy, acting in a less harmful way towards the environment, adding value to the brand, and pleasing customers, is a positive practice for everyone.

Generally, tourism accounts for about 5% of greenhouse gasses (GHG) emissions worldwide, out of which the largest proportion of 75% is associated with transportation, whereas 40% is caused by air traffic [1]. Another factor that contributes to the environmental footprint of tourism is accommodation. This sector represents approximately 20% of GHG emissions generated from tourism [2]. The variety of tourism types, which rely on clean nature and unpolluted environment as core values, impose the necessity to strive for sustainable tourism. Consequently, hotel management introduces such energy practices that enable environmental protection by reducing carbon dioxide, methane, nitrous oxide and other harmful emissions that provoke global-warming and climate changes. Yet, despite the gain in efficiency, the emissions from global tourism sector are predicted to grow 161% by

2035 [2]. This actually means that tourism implicates many negative effects that must be prevented or at least, decreased.

Around 90% of the primary energy in Macedonia is produced from fossil fuels, mainly lignite and heavy crude oil, so the energy sector contributes with over 70% in total emission of GHG resulting with enormous pollution. Based upon the State of Environment report [3], total emissions by sectors in Macedonia are due to combustion processes (60%), transport (30-40%), and other (less than 5%), along with 12% of recycled packaging.

Within the Strategy for Energy Development in Macedonia, it is foreseen to increase competitiveness in the wider regional energy market and to become high energy efficient [4]. It is proclaimed by 2020 to achieve improvement of energy efficiency by 20%, provision of energy from renewable energy sources (RES) in the amount of 20% of the final energy consumption, and at least a 10% share of RES in the final energy consumption in traffic [5]. So, maximizing the RES utilization is among strategic priorities, which is proved by the constant increase from 4.2% (2012) to 13.8% (2005) [6], making Macedonia a country with a relatively high RES utilization [5]. Moreover, based on many scenarios within national strategic documents, it is indicated that Macedonia can set the RES target share at 21% [7].

An option is to source own energy by applying renewable energy as a realistic alternative. Hotels particularly become aware and commit themselves to significantly reduce the energy used by them and eagerly look for cheaper energy sources that will contribute to sustainable and ecologically sound future. Although this paper contributes to the current research on energy savings in tourism and hotel industry in Macedonia [8-12], its main contribution lies in the intention to provide insights into the processes how Macedonian hospitality industry stakeholders manage environmental quality. It has a practical significance since it discusses the level of environmental quality of Macedonia, while simultaneously posing facts how some of the most energy-efficient luxury hotels in the world apply green initiatives. In times when energy prices have been high for a number of decades, it is more than justified to introduce incentives for hotel properties to go down the alternative energy route.

The paper is structured in several parts. After the introductory part, the following section presents the methodology and research findings on the applied environmental policy in Macedonian hotels. This is followed by a section that presents few cases as best green practices from hotels around the world. The article's final section offers the main conclusion and poses some recommendation on the investigated issue.

## **METHODOLOGICAL NOTES, FINDINGS AND DISCUSSION**

In order to enlighten the process how Macedonian hotels manage environmental quality, an online research was conducted in June 2016 among managers of three, four and five-star hotels. The main goal was to assess the perception of hotel management in the application of sustainable programs. Besides general data, the online questionnaire comprised of two hardcore set of questions addressing the issues of Environmental Policy, and Resources usage. Out of 127 identified managers, only 45 responded, representing a response rate of 35.4% standing as a relatively high for an online survey.

The Environmental policy part of the questionnaire consisted of eight yes/no questions related to the application of sustainable policies, practices, and programs. It was found that five-star hotels have by far the most positive environmental concerns since they claim to hold a Certificate for energy efficiency along with the four-star hotels, unlike the lower ranked hotels in Macedonia. The same is the finding for written plans for environmental protection, whereas surprisingly half of the three-star hotels claim to prepare it. Yet, none hotel type



prepares reports on environmental protection which is not in favor of supporting the European environmental impact assessment regulation. In this line, vast majority of three and four-star hotels do not have Eco label (80.0% of the three-star hotels, and 52.6% of the four-star hotels), do not hold Eco certificate (80.0 % of the three-star hotels and 73.7% of the four-star hotels), and do not have personnel responsible for environmental protection (68.8% of the three-star hotels and 52.6% of the four-star hotels). On the other hand, the findings completely differ in the case of five-star hotels, whereas half surveyed managers stated to have Eco label (50.0%) and Eco certificate (60.0%). Although in favor (70% claimed to have it), there is a certain risk in the interpretation and understanding the question related to the term ‘personnel for environmental protection’ which might be understood as a ‘personnel in charge for cleaning the environment’, which in most cases is a job of the housekeeping staff. Furthermore, none of the surveyed three and four-star hotels have ever received an award related to the environmental protection, although they have been working for over 15 years, strongly supports the general finding concerning environmental policy in Macedonia that still needs to be done. However, the positive impulse is detected in providing info to guests related to environmental protection, which points to the rather social responsibility of hotels and lack of energy efficiency practices.

The third part of the questionnaire consisted of eleven questions addressing the issue of applying different types of resources in hotels work. By categorizing responses in a 5-point Likert scale, the managerial perception of energy use and resource conservation was evaluated. General findings are alarming since they point to the extremely limited use of alternative sources of energy and new innovative approaches to saving energy consumption. The research found that the mean values for the extremely important RES are very low pointing to the lowest power when quantifying the item’s impact. So, mean values for the items referring geothermal energy, biofuel, photocell lighting, as well as the use of treated water, are far below the critical indicating that these determinants are meaningless for the hotels’ energy efficiency concept. The dimming system, which in general increases the lifespan of incandescent and LED light sources, is a smart, silent, reliable and efficient system for saving energy in hotels. Yet, this item is perceived as only a low impact determinant used extremely limited by Macedonian hotels.

On the other hand, solar energy and the “smart rooms” operations, are perceived as medium usage, while the use of energy saving systems that control every appliance in rooms and key-card control system that provides no power unless the room-key is inserted, along with the energy saving light bulbs, are found as resources with strong impacts. Very similarly, the central cooling/heating system along with the guest demands for linen and towel changes are assessed as very strong factors of influence on hotels business. The guests’ awareness of energy efficiency is constantly rising by having the choice to use the same towels and linens for the duration of the stay, rather than to incur the environmental costs of laundering them each day. This conservative measure is practiced by each hotel regardless the categorization and simultaneously increases the guest satisfaction and loyalty by showing their care for energy efficiency and climate change.

## **GREEN HOTEL PRACTICES**

A hotel may provide fully luxurious guest experience and be very green at the same time, in a manner that is practical, economic, and aesthetic. Figure 1 presents that extraordinary luxury and sustainability are not mutually exclusive. Moreover, it presents some sustainability best practices of worldwide applied standout environmental programs.

The main driving force why these facilities decided to become sustainable hotels is their commitment to leave as small an environmental footprint as possible. Moreover, the key objective of their sustainability programs is to ensure to be truly sustainable in all aspects of development principles being incorporated throughout the hotels' operations and in interactions with stakeholders and communities. Hence, their commitment to sustainability is deep and genuine. In this line, such green and sustainable hotels encompass a range of projects, like: recycling up to 94% of the waste; installing energy efficient equipment; reducing water consumption with efficient shower heads; installation of solar panels to generate green energy on-site; green procurement of recycled and biodegradable materials; involvement in community greening initiatives; etc. Almost all hotels carried out major modifications and redevelopment changes to the resorts including upgrades to air-conditioning by including new cooling towers, variable speed drives, as well as building management system and energy monitoring throughout the resorts by sub-metering all electrical metering points.



a) Hotel Bordessano, Yountville, California, USA [13]



b) Vineyard Hotel & Spa, Cape Town, South Africa [14]



c) Novotel Jaragua, Sao Paulo, Brasil [15]



d) Fairmont Resort Blue Mountains, Leura, Australia [16]

**Figure 1** Photovoltaic solar systems in hotels worldwide

Hotel Bordessano in Yountville, California, USA is one of few hotels in the U.S. that was certified LEED Platinum certification in 2015, due to its readiness to ensure environmental sustainability. The hotel installed a roof-top solar array (Figure 1a) that contributed to approximately 50% of total electricity consumption, with 6-8 years expected payback period

based on electricity costs and subsidies. The primary motivation was reducing the reliance on petroleum and other fossil fuels, thus making this hotel one of the greenest in the world.

By applying many energy savings projects, hotels significantly may reduce operating costs, where lighting, HVAC (heating, ventilation and air conditioning) and water-heating approximately accounts for 60% of total costs. So, The Vineyard Hotel & Spa in Cape Town, South Africa (Figure 1b) installed new laundry system and saved 34% energy compared to the old system, along with LED lights installed in the conference center which resulted in 75% energy saving.

Besides automation system that controls and reduces the use of each machine, saves energy and money, as well as installation of energy control in every guest room, and installation of heat exchangers that transforms the heat in the ambiance with boilers into energy to heat the water for guests' rooms, Novotel Jaragua in Sao Paulo, Brasil (Figure 1c) developed own vegetable garden that produces organic and free pesticide products. The solar-powered plants are producing clean energy and the harvested food is used by its own restaurants, guaranteeing the quality of each product.

The Fairmont Resort Blue Mountains in Leura, Australia installed a 100 kW PV solar system, out of which 30 kW is on the Golf club house's rooftop (Figure 1d). By this, the hotel has savings of 885 kWh/week through a reduction in energy, gas, and water throughout the resort. Furthermore, the installed PV solar system provides CO<sub>2</sub> savings in the range of 155.7 kg/per year for the Fairmont Resort and saves additional 46.3 kg/per year only for the Golf clubhouse. The use of solar energy is part of an integrated environmental energy management strategy, which also includes a 'smart' system allowing lights and air conditioning to be turned off in rooms when the guest is away and for ambient room temperature to be varied according to the outside temperature. This hotel also added a variable speed drive system on all air conditioning pumps, which allows better management of flows according to demand from guest rooms and common areas.

## CONCLUSION

Hotels must strive to make their facility to fit as an integral part of the local environment, but not to impede it. They must apply such policies that are based on strict environmental requirements. If the hotel operates in a sensitive natural environment, it should adopt and make a strong point of optimum sustainability practices. It is not sufficient just to talk about environmental good intentions, but the hotel has to embrace and promote sustainability.

Although energy projects led to savings, massive investments need to be done into infrastructure, whereas the consumption effect is immediate, but it takes several years until the capital investment is offset. On the other hand, the hotel maximizes its use of renewable energy only if ensuring efficient operations by installing high-efficiency ground-source heat pump system for heating and cooling needs, high-efficiency lighting, expansive windows for natural daylighting, guest room occupancy sensors that control lighting and conditioning, and automatic blinds to minimize unnecessary heat again.

The study recommends that hotels need to go one step further and take sustainability seriously enough to employ a specialist to manage energy efficiency, water conservation, waste reduction and community social responsibility. Additionally, it was found that one of the most important impacts of the sustainability programs and the biggest challenge in implementing environmental policy is the human factor. There is a need for increased awareness and change in behavior among staff as well as guests, who must be educated and

motivated to implement hotel's sustainability policy. It may be concluded that building and managing eco-friendly hotel is a big accomplishment, and the effort requests strong motivation by hotel managers and supervisors.

The research concludes that Macedonian hotel managers need to be truly aware that being ecologically responsible is paramount. The research survey found that many managers do not buy into the initiatives, or do not understand why they are important. Hence, it is impossible to achieve profound change. This has to be embedded in the core business of the hotel facility and cannot be treated as a secondary matter. Becoming eco and sustainable hotel means involving all stakeholders (employees, suppliers, customers, society, etc.). Only when managers show that small changes can produce incredible results, then hotels may expect to gain more results. Many positive examples of green and sustainable hotels prove that guests specifically choose to stay at such hotel because of its environmentally-friendly operations and minimized footprints.

## REFERENCES

- [1] GIZ-Deutsche Gesellschaft für Internationale Zusammenarbeit, Tourism Planning in Development Cooperation: A Handbook – Challenges – Consulting Approaches – Practical Examples – Tools. Bonn and Eschborn (2014).
- [2] UNWTO-UNEP-WMO, United Nations World Tourism Organization, United Nations Environment Program, World Meteorological Organization, Climate change and tourism: Responding to Global Challenges, UNWTO, Madrid (2008).
- [3] EEA – European Environment Agency, The European Environment – State and outlook 2015, Countries and regions: the Former Yugoslav Republic of Macedonia, SOER 2015 (2015).
- [4] MANU - Macedonian Academy of Sciences and Arts, Strategy for Energy Development in the Republic of Macedonia until 2035 (in Macedonian), Research Center for Energy and Sustainable Development, Skopje (2015).
- [5] MoE - Ministry of Economy, Government of the Republic of Macedonia, Strategy for Energy Development in the Republic of Macedonia until 2030, Skopje (2010a).
- [6] UNDP-United Nations Development Program, Renewable Energy Snapshots: the Former Yugoslav Republic of Macedonia – key information (2012).
- [7] MoE - Ministry of Economy, Government of the Republic of Macedonia, Strategy for Utilization of Renewable Sources in the Republic of Macedonia by 2020, Skopje (2010b).
- [8] B. Petrevska, V. Cingoski, Conference proceedings from 6th International Symposium on Industrial Engineering, Belgrade, 24-25 September 2015, Serbia, (2015a) 210–213.
- [9] B. Petrevska, V. Cingoski, Conference proceedings from ICONBEST 2015: Economic analysis of global trends in tourism, finance, education and management, Skopje, 9-10 October 2015, Macedonia, (2015b) 141–151.
- [10] B. Petrevska, V. Cingoski, Mechanical Engineering Scientific Journal; 34 (1) (2016) 311–321.
- [11] B. Petrevska, V. Cingoski, Sociology and Space; 1 (207) (2017) 101–116.
- [12] B. Petrevska, V. Cingoski, M. Serafimova, UTMS Journal of Economics; 7 (1) (2016) 123–132.
- [13] U.S. Department of Energy, Better Buildings Alliance, Case Study: Installing Hotel Rooftop Solar Array, Available at the following link: [https://betterbuildingssolutioncenter.energy.gov/sites/default/files/attachments/Installing\\_Hotel\\_Rooftop\\_Solar\\_Array.pdf](https://betterbuildingssolutioncenter.energy.gov/sites/default/files/attachments/Installing_Hotel_Rooftop_Solar_Array.pdf), Accessed on: 27 March 2018.



- [14] Green Hotelier, Luxury meets sustainability at The Vineyard, Cape Town, *Available on the following link:* <http://www.greenhotelier.org/destinations/africa/luxury-meets-sustainability-at-the-vineyard-cape-town/>, *Accessed on:* 27 March 2018.
- [15] Green Hotelier, Novotel Jaragua: building teamwork for a sustainable property, *Available at the following link:* <http://www.greenhotelier.org/best-practice-sub/case-studies/novotel-jaragua-building-teamwork-for-a-sustainable-property/>, *Accessed on:* 27 March 2018.
- [16] Green Hotelier, Fairmont Resort Leura: World Heritage environmental programmes, *Available on the following link:* <http://www.greenhotelier.org/destinations/asia-pacific/fairmont-resort-leura-world-heritage-environmental-programmes/>, *Accessed on:* 27 March 2018.