

The Importance of Energy for the Tourism Sector

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This paper studies the problems and specific issues related to tourism and energy consumption. The purpose of this paper is establishing the cause and effect relationship between tourism and energy consumption and determining whether the increase in the number of tourists increases energy consumption. The paper analyses the following EU countries with similar economic climates: Croatia, Slovenia, Slovakia, Hungary, and the Czech Republic. The analysis of the secondary data from statistical databases (Eurostat, WTO, IEA) using indicators such as the number of overnight stays, GDP and energy consumption, serves to establish the relationship between energy and tourism. In all observed countries, programme activities in the previous period were directed toward energy management capacity building and measures with a lower cost of implementation, such as educational and informational projects. This resulted in significant energy savings in the service sector, which is further demonstrated in the empirical part of the paper. The results indicate an increase in the number of overnight stays in all analysed countries, and show an evident direct impact of tourism on GDP. However, in some countries, an increase in the number of overnight stays does not increase energy consumption. These results indicate that some countries (Slovenia) have a more developed economy and therefore higher energy consumption, compared to some other countries (Croatia). This research provides reliable and actual qualitative and quantitative data about the problems of energy and tourism, as well as the overview of indicators in selected countries, demonstrating the cyclical relationship between tourism, economy, and energy.

Keywords: tourism, energy consumption, economic development, GDP

Introduction

Tourism needs to be considered from the viewpoint of energy consumption and the emission of greenhouse gasses into the atmosphere, especially CO₂ (Dobois & Ceron, 2006). According to the estimates by the United Nations World Tourism Organization (2016),

tourist traffic will constantly grow, and the European Union will record growing rates. For this reason, the issue needs to be studied further. The growth of tourist traffic and the increase in the number of tourists not only contribute to the economic welfare of the country but also to its energy consumption (Katirciogulu,

2014). Therefore, the purpose of this paper is to show the cause and effect relationship between tourism and energy consumption, and its impact on economic development. This is done through an analysis of indicators such as electric power consumption, the number of nights at tourist accommodation per inhabitant, and GDP. Since an increase in tourism activities comes with an increased demand for energy within various functions, the importance of energy for the tourism sector is undeniable. EU countries, as well as the entire international community, should act responsibly towards the environment, i.e. be an active participant in sustainable development while preserving natural resources. This refers to all segments of society including citizens, their households, as well as industry, transport, economy and tourism (Bačelić Medić, Pukšec, Mathiesen, & Duić, 2014). The current concentration of CO₂ in the atmosphere is already on the verge of environmentally acceptable limits, and the expected population growth and increased personal and public standards will have as a consequence an increase in energy consumption. This represents a great challenge, but also a great economic cost. The tourism sector is further expected to grow and develop which will, in turn, contribute to an increase in energy consumption. The increase in energy consumption caused by tourism development can have numerous negative effects on the quality of the environment, caused by climate change.

Literature Review

Several parallel processes are present in the service sector: the increase of energy efficiency increased capacity, the increase of heating and cooling energy consumption and the increase of the number of power consumers. Regarding energy demand, the service sector (and thus tourism as well) is constantly growing due to the long-term trends of energy consumption growth, which has only slowed in recent years. In this sector, two aspects should be considered: commercial services and public sector services. For example, in Croatia, commercial services account for about 12% of total energy consumption, while the public sector consumes about half the amount (Granić, 2012). The most important factor in commercial services is tourism,

while in the public sector those are health care institutions, schools and the like. Given their nature, in terms of energy, these sectors largely coincide with the building sector, but there are many other forms of energy consumption (food processing, washing, etc.). These two aspects of the service sector require a different approach: in commercial services (and tourism) through property owners, hoteliers, tourism managers and private owners, while the public sector requires a programmatic approach from the government bodies, local governments, and self-governments. This approach has turned the public sector into a leader in energy efficiency (United Nations Development Programme, 2013). In all observed countries, programme activities in the previous period were directed toward energy management capacity building and measures with a lower cost of implementation, such as educational and informational projects (SEM, 2013). This resulted in significant energy and economic savings, representing a quality guideline for the commercial service sector and the building sector in general.

Furthermore, a number of regional energy agencies emerged, which soon became involved in local energy activities within these sectors. One prerequisite for development is the appropriate set of regulations that would address the current barriers to the implementation of these projects and for which there are EU guidelines (European Commission, 2010). The service sector is certainly an area of dynamic development of energy usage with high growth potentials (Irsag, Pukšec, & Duić, 2012). The increased concerns about the state of the environment and sustainable development of tourism lead to an increased interest of scientists to study the impact of tourism trends in energy consumption, CO₂ emissions, and GDP (Becken, Simmons, & Frampton, 2003). However, the literature on energy economics is focused on the link between economic development, energy consumption, and climate change, and the results remain inconclusive (Katirciogulu, 2014). Some studies investigated the connection between energy consumption and real income growth (Kraft & Kraft, 1978; Lise & Monotfort, 2007; Odhiambo, 2009; Tang & Abosedra, 2014), others the validity of the environmental Kuznets curve hypothesis (Mulali & Ozturk, 2016), but few stud-

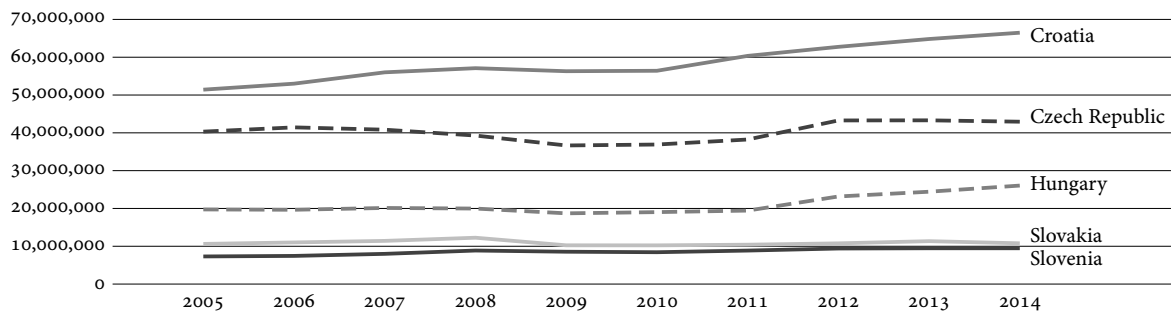


Figure 1 Nights Spent at Tourist Accommodation Establishments in the Period 2005–2014 (based on data provided by Eurostat, <http://ec.europa.eu/eurostat>)

ies examined the impact of tourism on energy consumption (Katirciogulu, 2014). Thus, for example, Gossling (2002) estimates that the energy consumption of global tourism is 14.8 PJ, of which 94% refers to the transportation sector, 3.5% to the accommodation sector and the rest to the activities sector. The global tourism industry requires vast amounts of energy for the production of its products, services and visitor experiences (Kelly and Williams, 2007; Becken, 2002; Becken & Simmons, 2002; Gossling, 2002). As awareness of tourism's energy impacts on the global environment increases, so does the knowledge of energy consumption's effects on tourism destination sustainability. Although the tourism sector in the European Union has been growing for years, little attention has been paid to controlling the destruction of natural resources and environmental pollution that affect the social conditions, culture and local environment of tourist destinations (Ozturk, 2016).

The Importance of Tourism for Selected Countries in The European Union

Tourism is the largest generator of well-being and employment in the world, and an engine for economic development, both in developed and the developing countries (Blažević, 2007). According to the European Commission, it is the third largest socio-economic activity in the EU (after the trade and distribution, and construction sectors), and has an overall positive impact on economic growth and employment. Traditionally, Europe plays a significant role in the overall international tourism flow, with a share of 51.4% (United Nations World Tourism Organization, 2015) in 2014. However, this percentage decreases from year to year;

while the period of 1985–1990 was marked by the annual growth rate of 7.4% (Jansen-Verbeke, 1995), this percentage decreased to 2.8% in the period of 2006–2014. For this reason, the European Union has placed much emphasis on the tourism sector as an engine of economic prosperity for its member countries given that the tourism sector does not merely represent a significant revenue stream, but also a vital source of employment and entrepreneurial vitality (Antonakakis, Grafouni, & Filis, 2015). In accordance with the different levels of development of the tourism services and infrastructure, the observed countries display different results, as shown in Figure 1.

Among the five selected countries, the highest number of overnight stays was realized in Croatia, already recognized as a tourism country. Croatia's tourism industry is characterized by mass tourism and 'sun and sea' as the main tourism product. Recently, a number of attempts to move away from such products have been made, resulting in the development of various selective forms of tourism such as cultural, health, sports tourism, and others. The second of the surveyed countries is the Czech Republic, with its capital Prague as one of the main generators of the number of overnight stays. In addition, the Czech Republic offers a number of health resorts, spas and ski resorts as places of interest. Compared to these two countries, Hungary, Slovakia, and Slovenia do not achieve such significant results but nevertheless, develop the products offered on the tourism market and thus ensure a competitive advantage. Furthermore, considering the economic variables in the observed countries, it can be concluded that tourism in Croatia is a more significant backbone of economic development, due to its

Table 1 Tourism Contribution to GDP and Employment

Country	(1)	(2)	(3)	(4)	(5)
Croatia	12.5	28.3	13.6	30.2	9000
Slovenia	3.5	12.7	3.9	13.0	14800
Czech Republic	2.6	8.0	4.9	10.0	11300
Hungary	3.9	10.3	5.6	9.8	8400
Slovakia	2.3	5.9	2.4	5.8	9500

Notes Column headings are as follows: (1) direct contribution to GDP, (2) total contribution to GDP, (3) direct contribution to employment, (4) total contribution to employment, (5) GDP per capita in EUR. Based on data from Eurostat (<http://ec.europa.eu/eurostat>).

greater contribution to GDP and employment. On the one hand, this can be an advantage, but on the other hand, changeable tourism cannot be the main and sole driver of economic development, nor would it be desirable for any of the analysed countries.

Other than Croatia, a significant contribution of tourism to GDP is recorded in Slovenia, which also has the highest GDP among the surveyed countries. Similarly, with a direct contribution to GDP of 3.9%, and direct contribution to employment of 5.6%, Hungary also displays a certain dependence on the tourism sector.

The development of tourism in Europe, and hence in the abovementioned countries, contributes to a stronger consolidation of the European Union, guaranteeing a link between regions and countries with their own systems, languages, traditions, and cultures.

Energy Consumption Assessment for the 2005–2013 Period

In the scientific and professional circles, CO₂ is widely accepted as the key factor of climate change, which can be altered by human activity, and thus affect the process of global warming (Šverko Grdić & Krstinić Nižić, 2016). Nowadays, due to the achieved level of technological development, the reduction of CO₂ emissions is considered to be most effectively achieved in the energy sector. This particularly refers to electricity production, where renewable energy sources (RES) play a significant role in reducing CO₂ emissions and show high potential for further CO₂ emissions reduc-

tion. However, thermal power generation plants require emission allowances that must be purchased on the EU ETS market. The current price of emission allowances for CO₂ is EUR 5–7/t (European Commission, 2010). With the withdrawal of about 900 million emission allowances on the EU ETS market, the price of CO₂ emission allowance is expected to exceed EUR 15/t.

To reduce CO₂ emissions, one of the EU 2020 targets is achieving 20% of renewable energy in gross final energy consumption while taking into account (European Commission, 2010):

1. individual national targets,
2. different starting points of each country,
3. the potential of renewable energy sources and
4. economic climate in EU member states.

These objectives are also pursued by other European countries that are not EU members. Electric power consumption in kWh per capita for selected countries is shown below. Electric power consumption measures the production of power plants and combined heat and power plants minus transmission, distribution, and transformation losses and own use by heat and power plants.

Table 2 shows a steady increase in electric power consumption in all surveyed countries. An economy's production and consumption of electricity are basic indicators of its size and level of development. Although a few countries export electric power, most production is for domestic consumption. Expanding the supply of electricity to meet the growing demand of increasingly urbanized and industrialized economies without incurring unacceptable social, economic, and environmental costs is one of the great challenges facing developing countries. Modern societies are becoming increasingly dependent on reliable and secure electricity supplies to support economic growth and community prosperity. This reliance is set to grow as more efficient and less carbon-intensive forms of power are developed and deployed to help decarbonize economies. Maintaining reliable and secure electricity services while seeking to rapidly decarbonize power systems is a key challenge for countries throughout the world. In developing economies,

Table 2 Electric Power Consumption

Country	2005	2006	2007	2008	2009	2010	2011	2012	2013
Croatia	3,475.9	3,635.8	3,737.6	3,878.0	3,711.6	3,813.7	3,900.6	3,819.3	3,754.3
Slovenia	6,917.9	7,123.5	7,137.8	6,920.0	6,103.4	6,521.1	6,806.2	6,777.8	6,833.2
Slovakia	4,932.8	5,153.1	5,272.4	5,294.4	4,954.1	5,201.4	5,347.5	5,137.8	5,202.5
Hungary	3,771.4	3,882.5	3,976.5	3,988.8	3,773.2	3,876.5	3,898.8	3,922.1	3,890.3
Czech Republic	6,357.4	6,528.5	6,518.2	6,489.1	6,139.4	6,348.4	6,298.7	6,304.6	6,284.8

Notes kWh per capita. Based on data from the International Energy Agency (<http://www.iea.org/statistics>) and the World Bank (<http://databank.worldbank.org>).

growth in energy use is closely related to growth in the modern sectors (industry, motorized transport, and urban areas) but energy use also reflects climatic, geographic, and economic factors (such as the relative price of energy). Energy use has been growing rapidly in low- and middle-income economies, but high-income economies still use almost five times as much energy on a per capita basis. Governments in many countries are increasingly aware of the urgent need to make better use of the world's energy resources. Improved energy efficiency is often the most economical and readily available means of improving energy security and reducing greenhouse gas emissions.

Tourism Destination Energy Consumption in Selected Countries

Energy is supplied to tourism resort destinations through a series of extraction, conversion and distribution systems. Energy use in tourism destinations is normally disproportionately greater than what is typically associated with other similar sized communities. This is largely due to the extensive use of energy-intensive technologies that deliver tourism amenities. A substantial quantity of energy is also required to construct new infrastructure, accommodations, and other facilities. The effects of the tourism industry can be divided according to the sectors, direct, indirect, and induced effects.

The potential cumulative effect of emissions associated with energy and the development of tourism destinations can be significant on both the local and global scales. On a local scale, air pollution is often caused by emissions arising from motor vehicles. Furthermore, air pollution reduces the beauty of a tourism

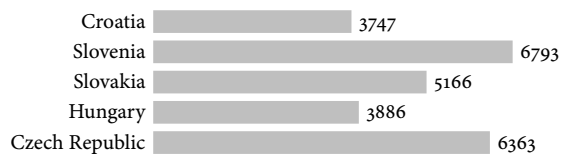


Figure 2 Average Electric Power Consumption, 2005–2013 (kWh per capita)

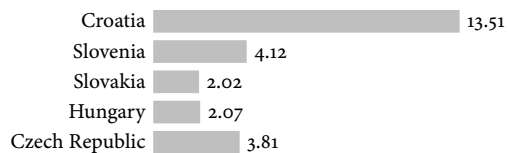


Figure 3 Average Nights at Tourist Accommodation per Inhabitant, 2005–2013

destination. Among the analysed countries, Croatia has the highest realized number of nights at tourist accommodation per inhabitant, but also the lowest electric power consumption (kWh per capita). However, countries such as Slovenia and the Czech Republic, which do not have such a large share of tourism in GDP and thus prove that they have developed other industries, have a higher rate of electric power consumption.

In the observed period, Croatia had the highest number of tourists, but the lowest electric power consumption. One of the reasons for this is that the share of tourism in GDP is as high as 13.6%. In contrast, Slovenia realized the smallest number of overnight stays, but also the highest energy consumption per capita, and the highest gross domestic product. At the level of all five observed countries, the data provide the following descriptive statistics.

As Table 4 shows, the ratio between nights at tourist accommodation per inhabitant and the mean value is

Table 3 Tourism's Effects on Destination Energy and GHG Emissions

Sector	Direct effects	Indirect effects	Induced effects
Residential	Energy consumed domestically by tourists staying in residential dwellings	–	Energy consumed domestically by resort workforce
Passenger Transportation	Energy consumed by tourists using private transportation	–	Energy consumed by resort workforce using private transportation
Commercial, industrial and institutional	Energy consumed by business in providing tourists with products and services	Energy consumed by businesses in providing other tourism businesses with products and services	Energy consumed by businesses in providing resort workforce with products and services
Municipal Buildings and Infrastructure	Energy consumed in providing tourists with municipal services	Energy consumed in providing tourism businesses with municipal services	Energy consumed in providing resort workforce with municipal services
Public Transport	Energy consumed in providing tourists with public transportation	–	Energy consumed in providing resort workforce with public transportation

Notes Adapted from Kelly and Williams (2007).

Table 4 Descriptive Statistics for All Observed Countries in the Period 2005–2013

Item	Minimum	Maximum	Mean	Std. deviation
Nights at tourist accommodation per inhabitant	76,337,372	518,168,000	247,476,732	188,098,348
Electric power consumption (kWh per capita)	33,726	61,140	46,722	12,509
GDP	8,400	14,800	10,600	2,585

higher in Croatia and the Czech Republic than in the other countries. The mean value of electric power consumption is higher in Slovenia and the Czech Republic than in the other countries.

From this, we can conclude that with regards to energy consumption, not only tourism but also other sectors of the economy play a significant role.

Conclusion and Recommendations

Sustained and long-term policies regarding tourism development are one of the missions across the globe for attracting tourists. However, the lack of proper policy planning and its implementation leads to serious environmental degradation. Tourism's role as a contributor to global energy consumption recently gained academic and institutional attention. This paper empirically investigated the long-term equilibrium relation between indicators such as the number of overnight stays, energy consumption, and GDP in

selected countries, in order to emphasize the importance of a more rational use of energy. Tourism entities will play a major role in the implementation of various measures for the rationalization of energy use. The emphasis on energetically sustainable tourism should come from two directions: from the tourists, who understand the damage they cause to the local community; and the local population that often refuses to accept responsibility for any damage caused by their own activities (e.g. the destruction of the environment and cultural and historical heritage). Both sides should insist that legislators and the industry ensure a sustainable tourism, and to properly coordinate their behaviours. Recommendations for future research are:

- Making accurate estimates of energy consumption for different types of power consumers.
- Providing more detailed information concern-

ing energy consumption in relation to various tourism destination's facilities and activities.

- Exploring the relationship between seasonality and energy consumption.

Such research would enable the development of a specific energy model that would provide the tourism destination planners with valuable information about the energy efficiency of their decisions.

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References

- Antonakakis, N., Grafouni, M., & Filis, G. (2015). How strong is the linkage between tourism and economic growth in Europe? *Economic Modelling*, 44, 142–155.
- Bačelić Medić, Z., Pukšec, T., Mathiesen, B. V., & Duić, N. (2014). Modelling energy demand of Croatian industry sector. *International Journal of Environment and Sustainable Development*, 13, 74–92.
- Becken, S. (2002). Analysing international tourism flows to estimate energy use associated with air travel. *Journal of Sustainable Tourism*, 10(2), 114–131.
- Becken, S., & Simmons, D. (2002). Understanding energy consumption patterns of tourist attractions and activities in New Zealand. *Tourism Management*, 23, 343–354.
- Becken, S., Simmons, D. G., & Frampton, C. (2003). Energy use associated with different travel choices. *Tourism Management*, 24, 267–277.
- Blažević, B. (2007). *Turizam u gospodarskom sustavu*. Opatija, Croatia: Fakultet za turistički i hotelski menadžment.
- Dobois, G., & Ceron, J. P. (2006). Tourism/leisure greenhouse gas emissions forecasts for 2050: Factors for change in France. *Journal of Sustainable Tourism*, 14(2), 172–191.
- European Commission. (2010). *Europe 2020: A European strategy for smart, sustainable and inclusive growth* (COM (2010) 2020 final). Brussels, Belgium: European Commission.
- Gossling, S. (2002). Global environmental consequences of tourism. *Global Environmental Change*, 12, 283–302.
- Granić, G. (2012). Vizija mogućnosti energetskeg razvoja, međusobnih odnosa i utjecaja u Hrvatskoj za razdoblje do 2050. godine. *Nafta*, 63(5–6), 161–172.
- Irsag, B., Pukšec, T., & Duić, N. (2012). Long term energy demand projection and potential for energy savings of Croatian tourism-catering trade sector. *Energy*, 48(1), 398–405.
- Jansen-Verbeke, M. (1995). A regional analysis of tourist flows within Europe. *Tourism Management*, 16(1), 73–82.
- Katirciogulu, S., T. (2014). International tourism, energy consumption and environmental pollution: The case of Turkey. *Renewable and Sustainable Energy Reviews*, 36, 180–187.
- Kelly, J., & Williams, P. W., (2007). Modelling tourism destination energy consumption and greenhouse gas emissions. *Journal of Sustainable Tourism*, 15(1), 67–90.
- Kraft J., & Kraft, A. (1978). On the relationship between energy and GNP. *Journal of Energy and Development*, 19(3), 401–430.
- Lise, W., & Monotfort, K. V. (2007). Energy consumption and GDP in Turkey: Is there a cointegration relationship. *Energy Economics*, 27, 1166–1178.
- Mulali, U. A., & Ozturk, I. (2016). The investigation of environmental Kuznets curve hypothesis in the advanced economies: The role on energy prices. *Renewable and Sustainable Energy Reviews*, 24, 1622–1631.
- Odhiambo, N. M. (2009). Energy consumption and economic growth nexus Tanzania an ARDL bounds testing approach. *Energy Policy*, 37, 617–622.
- Ozturk, I. (2016). The relationships among tourism development, energy demand, and growth factors in developed and developing countries. *International Journal of Sustainable Development & World Ecology*, 23(2), 122–131.
- Šverko Grdić, Z., & Krstinić Nižić, M. (2016). Development of tourist demand in correlation with climate change in the Republic of Croatia. *Ekonomski pregled*, 67(1): 27–43.
- Tang, F. C., & Abosedra, S. (2014). The impacts of tourism, energy consumption and political instability on economic growth in the MENA countries. *Energy Policy*, 68(C), 458–464.
- United Nations Development Programme. (2013). Removing barriers to energy efficiency in Croatia (EE project). Retrieved from http://www.hr.undp.org/content/croatia/en/home/operations/projects/environment_and_energy/RemovingBarriers.html
- United Nations World Tourism Organization. (2016). *UNWTO annual report 2015*. Madrid, Spain: United Nations World Tourism Organization.
- United Nations World Tourism Organization. (2015). *UNWTO tourism highlights: 2015 edition*. Madrid, Spain: United Nations World Tourism Organization.



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