FACTA UNIVERSITATIS
Series: **Law and Politics** Vol. 18, Nº 2, 2020, pp. 55-67
https://doi.org/10.22190/FULP2002055P

Review Paper

THE IMPACT OF INTERNATIONAL TOURISM ON ENERGY CONSUMPTION: A PANEL STUDY OF THE WESTERN BALKANS AND THE EUROPEAN UNION

UDC 621.311:338.48(4-672EU:497)

Jelena Petrović[1], Žarko Dimitrijević[2]

[1]Faculty of Science and Mathematics, University of Niš, Serbia
[2]Public Enforcement Officer for the area of the High Court and the Commercial Court in Niš, Serbia

Abstract. *During the 21st century, international tourism has recorded a steady increase and a growing importance for the economic growth and development of many countries. Yet, tourism in general and international tourism in particular require a vast amount of energy for products and services that are needed to satisfy tourists` needs and wants. The purpose of this paper is to analyze the impact of international tourism on the final energy consumption in the Western Balkans and the European Union (EU) countries in the period from 2007 to 2017. The results of regression analysis indicate that the impact of the number of foreign tourists on final energy consumption depends on the level of international tourism development. Concurrently, the results indicate that population and GDP per capita have an important impact on the final energy consumption in the EU and the Western Balkans countries..*

Key words: *international tourism, energy consumption, foreign tourists, population, GDP per capita*

1. INTRODUCTION

The European Union (EU) records an increase of final energy consumption in the period from 2014 to 2018. In 2018, the transport sector accounted for 30.95%, households for 27.2% and commercial and public services for 14.28% of the final energy consumption in the EU (European Commission, 2018).

Tourism requires vast amounts of energy for manufacturing products and providing services aimed at satisfying tourist expectations and needs (Kelly & Williams, 2007: 67-

Received May 21st 2020 / Accepted September 21st 2020
Corresponding author: Jelena Petrović, PhD in Economics, Associate Professor, University of Niš, Faculty of Science and Mathematics, Department of Geography, Niš, Serbia, Višegradska 33. E-mail: jelena25@pmf.ni.ac.rs
Žarko Dimitrijević, Public Enforcement Officer for the area of the High Court and the Commercial Court in Niš, Serbia. E-mail: dimitrijevic.zarko@gmail.com

68). Energy provides amenities and facilities in the tourism destination and facilitates the transportation of tourists (Becken, 2002: 127-129; Becken & Simmons, 2002: 352-353; Katircioglu, 2014: 186; Yorucu & Mehmet, 2015: 1197). In 2018 alone, the EU welcomed about 440 million foreign tourists. In the period from 2005 to 2018, the number of overnight stays by non-residents grew by 59% while the number of overnight stays by residents during domestic trips grew by 26% (European Commission, 2020). In the EU, the number of foreign tourists is expected to increase by 1,9% per year, or about 9 million per year by 2030 (UNWTO, 2018: 9).

In relevant literature, special attention has been given to the relationship between energy consumption and economic growth, as well as between tourism and economic growth. But, the literature on the relationship between energy consumption and tourism is rather limited. In the energy economics literature, the central issue has been whether economic growth causes energy consumption or vice versa. According to this central issue, several ideas can be distinguished: 1) there is no causality between economic growth and economic consumption (Cheng, 1995: 82; Jobert & Karanfil, 2007: 5454-5455; Payne, 2009: 577); 2) there is bidirectional causality between economic growth and economic consumption (Tang, 2008: 3083-3084; Glasure, 2002: 363; Lee, Chang & Chen, 2008: 2370-2371; Chandran &Tang, 2013: 317; Vidyarthi, 2013: 278; Tang & Tan, 2013: 303-304; Mudarissov & Lee, 2014: 63); 3) energy consumption causes economic growth (Apergis & Payne, 2009: 211; Lean & Smyth, 2010: 1862-1863; Soares, Kim & Heo, 2014: 58); and 4) economic growth causes energy consumption (Ghosh, 2009: 2929; Paul & Uddin, 2011: 486; Shahbaz & Feridun, 2012: 1583; Chandran & Tang, 2013: 310).

Tourism generates national income and employment in tourism and entire economy. On the one hand, tourism contributes to economic growth and economic development but, on the other hand, the rapid economic growth in the developed countries attracts foreign tourists. International tourism is "a prime source of foreign exchange earnings and generates export revenues" (Lee & Brahmasrene, 2013: 70). Some previous studies reported that tourism has a positive impact on economic growth in Spain (Balaguer & Cantavella-Jorda, 2002: 882), Singapure (Katricioglu, 2010: 1095; Lee & Hung, 2010: 355), Malaysia (Tang, 2011: 98-100), Pakistan (Jalil, Mahmood, &, Idrees, 2013:188-190), while other studies reported that economic growth has a positive impact on tourism development (Oh, 2005: 43; Tiwari, Ozturk & Aruna, 2013: 258).

Although lodging facilities and transport for tourists are major sources for final energy consumption, "the role of energy consumption in tourism is nearly ignored" in relevant literature (Tiwari et al, 2013: 249). Katircioglu (2014:186-187), as well as Yorucu and Mehmet (2015: 1202-1204) reported that tourism causes energy consumption while Tiwari and his associates (2013:258) reported that energy consumption has an impact on tourism.

Bearing in mind that the inflow of foreign tourists "can be seen as a temporary increase in the local population" (Leon, Arana & Aleman, 2014: 1172), this paper will focus on analyzing the impact of foreign tourists, population and GDP (Gross domestic product) per capita on final energy consumption. The paper aims to identify whether the number of foreign tourists contributes to the increase in final energy consumption in the Western Balkan countries (Albania, Montenegro, North Macedonia, and Serbia[1]), the transition countries in EU (Bulgaria, Czech Republic, Estonia, Croatia, Latvia, Lithuania, Poland, Romania, Slovenia, Slovak Republic, and Hungary) and the developed EU countries

[1] Bosnia and Herzegovina is not observed because the data is missing for this country.

(Belgium, Denmark, Germany, Ireland, Greece, Spain, France, Italy, Cyprus, Luxemburg, Hungary, Malta, the Netherlands, Austria, Portugal, Finland, and the United Kingdom) in the period from 2007 to 2017.

2. METHODS AND HYPOTHESES

The research database has included the data about foreign tourists, residents and GDP per capita from the World Development Indicators (World Bank, 2007-2017) and the data about final energy consumption from the Eurostat Database (European Commision, 2007-2017).

This paper relies on the description statistics and regression analysis. In SPSS software, description statistics has determined minimal, maximum and mean values of final energy consumption, GDP per capita, and the number of foreign tourists and residents for each observed country in the period from 2007 to 2017. In STATA software, using panel data of the Western Balkans and the EU countries from 2007 to 2017, regression analysis has examined the impact of the number of foreign tourists, the number of residents, and GDP per capita on final energy consumption.

The hypotheses to be tested in this study are the following:

- *H1:* The number of foreign tourists has a statistically significant positive impact on final energy consumption in the Western Balkans countries, transition and developed EU countries.
- *H2:* The number of residents has a statistically significant positive impact on final energy consumption in the Western Balkans countries, transition and developed EU countries.
- *H3:* GDP per capita has a statistically significant positive impact on final energy consumption in the Western Balkans countries, transition and developed EU countries.

3. RESEARCH RESULTS AND DISCUSSION

3.1. Analysis of the number of foreign tourists and residents and economic growth in the Western Balkan countries

Table 1 shows the mean, minimal and maximum values of the final energy consumption, the number of foreign tourists, the number of residents, and GDP per capita in the Western Balkan countries in the period from 2007 to 2017.

In the period from 2007 to 2017, Albania recorded an increase in the final energy consumption, the number of foreign tourists and GDP per capita. The highest number of foreign tourists was recorded in 2017 but, in the observed period, there was a decrease in the number of residents. Montenegro and North Macedonia recorded a decrease in the final energy consumption and an increase of GDP per capita, the number of foreign tourists and the number of residents. The Republic of Serbia recorded a decrease in the final energy consumption and the number of residents, and an increase in the number of foreign tourists and GDP per capita; the highest number of foreign tourists was recorded in 2017.

Table 1 Analysis of tourism turnover, population, and GDP per capita in the Western Balkan countries in the period from 2007 to 2017

	Final energy consumption (millions tones of oil equivalent)	Number of foreign tourists (in thousands)	Number of residents (in thousands)	GDP per capita (current US$)
Albania				
Mean	1894.0553	2775.5455	2907.0840	4223.6772
Std. Deviation	125.69636	1161.58120	30.55135	288.51516
Montenegro				
Mean	718.0094	1250.8000	619.8725	6876.6983
Std. Deviation	77.28443	228.83949	2.21969	458.67761
North Macedonia				
Mean	1729.1166	501.0833	1953.1307	5127.3983
Std. Deviation	322.20877	450.14916	419.11382	930.31571
Serbia				
Mean	8546.9777	918.6364	7204.2265	6241.8164
Std. Deviation	662.53814	285.22632	121.93235	508.73012

Source: Prepared by the authors (SPSS 13)

3.2. Analysis of the number of foreign tourists and residents and economic growth in EU

All transition countries in the EU, except Poland and Hungary, recorded a decline in the final energy consumption in the period from 2007 to 2017. Croatia achieved the highest mean value of foreign tourists while Slovenia achieved the highest mean value of GDP per capita in relation to other transition countries in EU. Hungary recorded the highest mean value of final energy consumption while Poland had the highest mean value of the number of residents.

As illustrated in Table 3 and Table 4, all developed EU countries, except Belgium, Germany, Malta, Sweden and Austria, recorded a decline in the final energy consumption in the period from 2007 to 2017. Germany recorded the highest mean value of final energy consumption and the number of residents, while Malta recorded the lowest mean value of final energy consumption, the number of residents, and the number of foreign tourists. Italy recorded the highest mean value of number of foreign tourists while Luxemburg recorded the highest mean value of GDP per capita in the observed period.

Table 2 Analysis of tourism turnover, population, and GDP per capita in transition countries in the EU in the period from 2007 to 2017

	Final energy consumption (millions tones of oil equivalent)	Number of foreign tourists (in thousands)	Number of residents (in thousands)	GDP per capita (current US$)
Bulgaria				
Mean	9187.0121	6729.9091	7309.3609	7305.0193
Std. Deviation	465.14918	1117.83160	151.79374	633.36788
Czech Republic				
Mean	23689.4145	7653.9091	10486.8271	19844.4525
Std. Deviation	701.80652	1327.25495	84.90793	1434.75212
Croatia				
Mean	6780.2538	10907.3636	4251.3884	13759.5261
Std. Deviation	375.28831	2322.95520	61.08144	1189.62591
Latvia				
Mean	3880.9555	1646.0000	2054.2400	14160.6264
Std. Deviation	181.05843	235.68878	89.00431	1489.58636
Lithuania				
Mean	4878.6964	1871.3636	3017.9283	14368.4168
Std. Deviation	201.13203	366.29913	137.26518	1728.61925
Poland				
Mean	62880.2915	14976.5455	38050.0355	13037.5365
Std. Deviation	3009.65021	2105.31857	62.51655	1041.44957
Romania				
Mean	22325.2652	8558.7273	20112.6140	9284.3445
Std. Deviation	778.22277	1159.51715	381.04569	871.07970
Slovenia				
Mean	4868.7693	2326.3636	2050.4169	23715.5970
Std. Deviation	179.50674	572.90772	17.10449	1761.75114
Slovakia				
Mean	9626.4703	1647.2727	5405.7750	17368.4860
Std. Deviation	584.49154	270.99597	21.46647	987.73034
Hungary				
Mean	16748.7015	4230.0000	9928.4815	13721.5058
Std. Deviation	597.26301	819.20559	94.55626	912.00143

Source: Prepared by the authors (SPSS 13)

Table 3 Analysis of tourism turnover, population, and GDP per capita in developed EU coutries (Belgium, Denmark, Germany, Ireland, Greece, Spain, France, Italy, Cyprus, Luxemburg and Malta) in the period from 2007 to 2017

	Final energy consumption (millions tones of oil equivalent)	Number of foreign tourists (in thousands)	Number of residents (in thousands)	GDP per capita (current US$)
		Belgium		
Mean	33155.4031	7550.6364	11047.4716	44980.5023
Std. Deviation	925.25152	506.03740	256.81237	2294.84538
		Denmark		
Mean	14026.6229	9706.5455	5602.0783	58915.9129
Std. Deviation	633.91455	1043.32702	96.30385	3325.86394
				Germany
Mean	202759.4210	30155.0909	81552.4454	43841.7824
Std. Deviation	4600.01551	4748.61231	831.49661	2444.79196
		Ireland		
Mean	10911.3209	8445.4545	4609.9881	56921.3216
Std. Deviation	856.43423	1123.15835	117.95060	6902.69125
		Greece		
Mean	17384.0887	19046.9091	10973.9763	24037.8005
Std. Deviation	2272.07194	4483.80413	139.78729	4893.58993
		Spain		
Mean	81646.4010	62294.9091	46387.1880	29934.7176
Std. Deviation	6208.82801	9425.74859	443.16807	2834.95334
		France		
Mean	142938.4833	81571.9091	65614.6736	41052.5494
Std. Deviation	3309.44428	3178.56988	1002.37894	2734.65082
		Italy		
Mean	117938.8344	47579.0000	59770.4424	35445.0417
Std. Deviation	6945.62933	4741.48909	840.60934	3231.76995
		Cyprus		
Mean	1538.8055	2575.9091	1129.3503	29011.4311
Std. Deviation	113.45891	451.49163	37.20312	3764.15515
		Luxemburg		
Mean	3739.1064	949.0909	533.6641	108768.3462
Std. Deviation	156.81498	95.61742	39.13337	5814.08304
		Malta		
Mean	419.4915	1564.4545	428.0288	23111.1487
Std. Deviation	37.39968	337.66592	20.27266	2412.92374

Source: Prepared by the authors (SPSS 13)

Table 4 Analysis of tourism turnover, population, and GDP per capita in developed EU countries (the Netherland, Austria, Portugal, Finland, the United Kingdom and Sweden) in the period from 2007 to 2017

	Final energy consumption (millions tones of oil equivalent)	Number of foreign tourists (in thousands)	Number of residents (in thousands)	GDP per capita (current US$)
		Netherland		
Mean	46518.2083	12760.2727	16744.7345	51075.1499
Std. Deviation	2311.71769	2597.90631	239.55018	3568.46679
		Austria		
Mean	25460.9040	24331.1818	8486.2233	48419.1001
Std. Deviation	562.96522	2863.81074	172.89487	2644.05974
		Portugal		
Mean	16284.6617	9263.6364	10468.8252	21938.1263
Std. Deviation	1088.60047	3085.27757	104.96506	1601.75912
		Finland		
Mean	23995.5209	2638.6364	5408.1925	47948.5968
Std. Deviation	785.51707	263.69462	75.48371	3163.88207
		United Kingdom		
Mean	124083.8805	31606.4545	63695.9984	43433.4458
Std. Deviation	5594.54389	3154.57482	1566.69952	3743.15136
		Sweden		
Mean	31689.8515	5585.0909	9553.5832	55018.2403
Std. Deviation	657.60082	817.04657	292.80358	4442.78793

3.3. Regression analysis of the impact of foreign tourists, population and economic growth on the final energy consumption in the Western Balkan countries, transition and developed countries in EU

The results of regression analysis of the impact of foreign tourists, population and economic growth in the Western Balkan countries are given in Table 5. The results of regression analysis indicate that the number of foreign tourists, the number of residents and GDP per capita had a significant impact on the final energy consumption in the period from 2007 to 2017 because the probability value (P>[t]) is less than 0.005. While the number of foreign tourists has the negative impact on the final energy consumption, the GDP per capita and the number of residents have a positive impact on the final energy consumption in the Western Balkan countries. The coefficient value indicates that the number of residents has a higher impact on the final energy consumption in relation to the GDP per capita.

Table 5 The regression MODEL – the impact of the number of foreign tourists, the number of residents, and GDP per capita in the Western Balkan countries

Random-effects GLS regression					Number of obs = 44	
Group variable: countrynum					Number of groups = 4	
R-sq: within = 0.0744					Obs per group: min = 11	
between = 0.9994					avg = 11.0	
overall = 0.9873					max = 11	
					Wald chi2(3) = 3108.28	
corr(u_i, X) = 0 (assumed)					Prob > chi2 = 0.0000	
Final energy consumption	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Foreign tourists	-.1974127	.0544246	-3.63	0.000	-.3040829	-.0907424
Residents	1.225532	.0227285	53.92	0.000	1.180985	1.270079
GDP per capita	.422747	.0498969	8.47	0.000	.3249508	.5205432
_cons	-2770.888	322.1391	-8.60	0.000	-3402.269	-2139.506
sigma_u	0					
sigma_e	249.47436					
rho	0 (fraction of variance due to u_i)					

Source: Prepared by the authors (STATA 13)

Table 6 shows the results of regression analysis of the impact of number of foreign tourists, the number of residents, and GDP per capita on final energy consumption in transition countries in EU. The results of regression analysis indicate that the number of foreign tourists, the number of residents, and GDP per capita had a significant positive impact on the final energy consumption in the period from 2007 to 2017 because the probability value (P>[t]) is less than 0.005. The value of the coefficients indicates that the number of residents has a higher impact on the final energy consumption in relation to the number of foreign tourists and GDP per capita.

Table 6 The regression MODEL – the impact of number of foreign tourists, number of residents and GDP per capita in transition countries in the EU

Random-effects GLS regression					Number of obs = 121	
Group variable: countrynum					Number of groups = 11	
R-sq: within = 0.0502					Obs per group: min = 11	
between = 0.9589					avg = 11.0	
overall = 0.9558					max = 11	
					Wald chi2(3) = 245.42	
corr(u_i, X) = 0 (assumed)					Prob > chi2 = 0.0000	
Final energy consumption	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Foreign tourists	.2099759	.0779536	2.69	0.007	.0571896	.3627622
Residents	1.49538	.1019684	14.67	0.000	1.295526	1.695235
GDP per capita	.1602413	.0699482	2.29	0.022	.0231453	.2973372
_cons	-2492.319	1849.712	-1.35	0.178	-6117.687	1133.049
sigma_u	3442.7823					
sigma_e	1001.3999					
rho	.92199465 (fraction of variance due to u_i)					

Source: Prepared by the authors (STATA 13)

Table 7 shows the results of regression analysis of the impact of number of foreign tourists, the number of residents, and GDP per capita on the final energy consumption in developed EU countries. The results of regression analysis indicate that the number of foreign tourists, the number of residents, and GDP per capita had a significant impact on the final energy consumption in the period from 2007 to 2017 because the probability value (P>[t]) is less than 0.005. While the number of foreign tourists has the negative impact on the final energy consumption, GDP per capita and the number of residents have a positive impact on the final energy consumption in developed EU countries. The value of the coefficients indicates that the number of residents has a higher impact on the final energy consumption in relation to the GDP per capita.

Table 7 The regression MODEL – the impact of number of foreign tourists, number of residents and GDP per capita in developed EU countries

Random-effects GLS regression					Number of obs = 187	
Group variable: countrynum					Number of groups = 17	
R-sq: within = 0.0020					Obs per group: min = 11	
between = 0.9742					avg = 11.0	
overall = 0.9709					max = 11	
					Wald chi2(3) = 255.14	
corr(u_i, X) = 0 (assumed)					Prob > chi2 = 0.0000	
Final energy consumption	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Foreign tourists	-.3483285	.076995	-4.52	0.000	-.499236	-.197421
Residents	2.104512	.1341664	15.69	0.000	1.84155	2.367473
GDP per capita	.1955801	.0670169	2.92	0.004	.0642294	.3269309
_cons	1390.55	5599.739	0.25	0.804	-9584.736	12365.84
sigma_u 10273.178						
sigma_e 2553.1534						
rho .94182777 (fraction of variance due to u_i)						

Source: Prepared by the authors (STATA 13)

According to the regression analysis results, we can conclude that hypothesis H1 has not been confirmed because the number of foreign tourists has a statistically significant negative impact on the final energy consumption in the Western Balkan countries and in developed EU countries. Hypothesis H2 has been confirmed because the number of residents has a statistically significant positive impact on the final energy consumption in the Western Balkan countries, in developed and transition countries in the EU. Hypothesis H3 has been confirmed because GDP per capita has a statistically significant positive impact on the final energy consumption in the Western Balkan countries, in developed and transition countries in the EU.

3.4. Adopted energy development strategies of the observed countries in relation to the proven hypotheses

Although the attempt to prove the first hypotheses did not lead to the expected results in the theoretical model, practice proves that the influence of the tourism sector plays a significant role in designing the energy sector strategies in some countries.

Of all the observed Western Balkan countries, the greatest impact of tourism on the Energy Development Strategy can be observed in Montenegro (Ministry of Labor and

Entrepreneurship, 2014: 33). In this strategy, the Montenegrin government has envisaged significant investments to cover the projected natural gas needs that would reach 26% total needs for this energy source in the coastal region. Albania also observes the tourism sector from energy aspects and endeavours to increase energy potentials by installing solar panels (Ministry of Industry and Energy, National Energy Agency, 2003: 18). As for the Republic of North Macedonia, there are no available data on this matter in the 2019 draft of the Strategy for Energy Development of the Republic of North Macedonia until 2040, Given the fact that the economy of the Republic of Serbia does not substantially rely on tourism, the Energy Sector Development Strategy of the Republic of Serbia for the period by 2025 with projections by 2030 (Ministry of Mining and Energy, 2016) does not specifically deal with tourism as a important factor for energy consumption, which ultimately confirms the considerations within the framework of proving the first hypothesis.

In the EU countries, intensive legislative work on preparing the energy sector integration was interrupted by the COVID-19 pandemic (European Commission, 14 April 2020). Within the Strategy for Sustainable and Smart Mobility, the transport sector is expected to consume a huge share of the projected increase in energy demand for mobility and exchange of tourists. However, that aspect remains unconfirmed and may be further examined in the future.

CONCLUSION

The conducted research on the World Bank and Eurostat energy consumption statistics in the period 2007-2017 shows that Poland, Hungary, Albania, Belgium, Germany, Malta, Sweden and Austria recorded an increase in the final energy consumption while other observed countries recorded a decrease in the final energy consumption. Similar to the studies conducted by Katircioğlu (2014: 186-187) and Yorucu and Mehmet (2015: 1202-1204), the results of the regression analyses conducted for the purposes of this paper have confirmed the impact of the number of foreign tourists on the final energy consumption, but this impact significantly depends on the level of tourism development. The research results indicate that the number of foreign tourists has a negative impact on the final energy consumption in the Western Balkan countries as well as in developed EU member states, including both undeveloped and highly developed countries, while the number of foreign tourists has a positive impact on the final energy consumption in transition countries in the EU or in the member states which have reached an intermediate level of tourism development. At the same time, the results of regression analyses have revealed that the number of residents and GDP per capita have a significant positive impact on the final energy consumption in the Western Balkan countries as well as in transition and developed countries in the EU.

REFERENCES

Apergis, N., Payne, J. E., (2009). Energy consumption and economic growth in Central America: Evidence from a panel co-integration and error-correction model, *Energy Economics*, Vol. 31., No. 2., 2009, pp. 211-216. https://www.sciencedirect.com/science/article/pii/S0140988308001503

Balaguer, J., Cantavella-Jorda, M., (2002). Tourism as a Long-run Economic Growth Factor: The Spanish Case, *Applied Economics*, Vol. 34, No. 7., 2002, pp. 877–884. https://www.tandfonline.com/doi/abs/10.1080/00036840110058923

Becken, S., (2002) Analysing international tourist flows to estimate energy use associated with air travel, *Journal of Sustainable Tourism*, Vol. 10., No. 2., 2002, pp. 114–31. https://www.tandfonline.com/doi/abs/10.1080/09669580208667157

Becken, S., Simmons, D., (2002). Understanding energy consumption patterns of tourist attractions and activities in New Zealand, *Tourism Management*, Vol. 23., No. 4., 2002, pp. 343–54. https://www.academia.edu/2770816/Understanding_energy_consumption_patterns_of_tourist_attractions_and_activities_in_New_Zealand

Chandran, V. G. R., Tang, C.F., (2013). The dynamic links between CO2 emissions, economic growth and coal consumption in China and India, *Applied Energy*, Vol. 104., No. C, 2013, pp. 310-318. https://www.sciencedirect.com/science/article/abs/pii/S0306261912007611

Cheng, B., (1995). An investigation of co-integration and causality between energy consumption and economic growth, *Journal of Energy and Development*, Vol. 21., No. 1., 1995, pp. 73–84.

Ghosh, S., (2009). Electricity supply, employment and real GDP in India: Evidence from co-integration and Granger-causality tests, *Energy Policy*, Vol. 37., No. 8., 2009, pp. 2926-2929. https://www.sciencedirect.com/science/article/abs/pii/S0301421509001724

Glasure, Y.U., (2002). Energy and national income in Korea: further evidence on the role of omitted variables, *Energy Economics*, Vol. 24., No. 4., 2002, pp. 355–365. https://www.sciencedirect.com/science/article/pii/S0140988302000361

Jalil, A., Mahmood, T., Idrees, M., (2013). Tourism-growth nexus in Pakistan: Evidence from ARDL bounds tests, *Economic Modelling*, Vol. 35., No. C, 2013, pp. 185-191. https://www.sciencedirect.com/science/article/abs/pii/S0264999313002526

Jobert, T., Karanfil, F., (2007). Sectoral energy consumption by source and economic growth in Turkey, *Energy Policy*, Vol. 35., No. 11., 2007, pp. 5447–5456. https://www.sciencedirect.com/science/article/abs/pii/S030142150700208X

Katircioğlu, S. T., (2010). Testing the tourism-led growth hypothesis for Singapore – an empirical investigation from bounds test to cointegration and Granger causality tests, *Tourism Economics*, Vol. 16., No. 4, 2010, pp. 1095-1101. https://journals.sagepub.com/doi/10.5367/te.2010.0012

Katircioğlu, S. T., (2014). International tourism, energy consumption, and environmental pollution: The case of Turkey, *Renewable and Sustainable Energy Reviews*, 36(C), 180-187. https://www.sciencedirect.com/science/article/abs/pii/S1364032114002962

Kelly, J., Williams, P., (2007). Modeling Tourism Destination Energy Consumption and Greenhouse Gas Emissions: Whistler, British Columbia, Canada, *Journal of Sustainable Tourism*, Vol. 15., No. 1., 2007, pp. 67-90; retrieved 5th February 2020 from. https://www.researchgate.net/publication/241745590_Modelling_Tourism_Destination_Energy_Consumption_and_Greenhouse_Gas_Emissions_Whistler_British_Columbia_Canada

Lean, H. H., Smyth, R., (2010). CO2 emissions, electricity consumption and output in ASEAN, *Applied Energy*, Vol. 87., No. 6., 2010, pp. 1858-1864. https://www.sciencedirect.com/science/article/abs/pii/S0306261910000346

Lee, C.C., Chang, C.P., Chen, P.F., (2008). Energy-income causality in OECD countries revisited: the key role of capital stock, *Energy Economics*, Vol. 30., No. 1., 2008, pp. 2359–2373. https://www.sciencedirect.com/science/article/pii/S0140988308000224

Lee, C. G., Hung, W. T., (2010). Tourism, health and income in Singapore, *International Journal of Tourism Research*, Vol. 12., No. 4., 2010, pp. 355-359. https://onlinelibrary.wiley.com/doi/epdf/10.1002/jtr.75

Lee, J. W., Brahmasrene, T., (2013). Investigating the influence of tourism on economic growth and carbon emissions: Evidence from panel analysis of the European Union, *Tourism Management*, Vol.38, 2013, pp.69-76. https://www.sciencedirect.com/science/article/abs/pii/S0261517713000678

Leon, C. J., Arana, J. E., Aleman, A. H., (2014). CO2 emissions and tourism in developed and less developed countries, *Applied Economics Letters*, Vol. 21., No. 16., 2014, pp. 1169-1173. https://www.tandfonline.com/doi/full/10.1080/13504851.2014.916376?scroll=top&needAccess=true

Mudarissov, B. A., Lee, Y., (2014). The relationship between energy consumption and economic growth in Kazakhstan, *Geosystem Engineering*, Vol. 17., No. 1., 2014, pp. 63-68. https://www.tandfonline.com/doi/full/10.1080/12269328.2014.895083?scroll=top&needAccess=true

Oh, C.O., (2005). Contribution of tourism development to economic growth in the Korean, economy. *Tourism Management*, Vol. 26., No. 1., 2005, pp. 39-44. https://www.sciencedirect.com/science/article/abs/pii/S0261517703001997

Paul, B. P., Uddin, G.S., (2011). Energy and output dynamics in Bangladesh, *Energy Economics*, Vol. 33., No. 3., 2011, pp. 480-487. https://www.sciencedirect.com/science/article/pii/S0140988310001994

Payne, J. E., (2009). On the dynamics of energy consumption and output in the US, *Applied Energy*, Vol. 86., No. 4., 2009, pp. 75–77. https://www.sciencedirect.com/science/article/abs/pii/S030626190800172

Shahbaz, M., Feridun, M., (2012). Electricity consumption and economic growth empirical evidence from Pakistan, *Quality and Quantity*, Vol. 46., No. 5., 2012, pp. 1583-1599. https://link.springer.com/article/10.1007/s11135-011-9468-3

Soares, J. A., Kim, Y. K., Heo, E., (2014). Analysis of causality between energy consumption and economic growth in Indonesia, *Geosystem Engineering*, Vol. 17., No. 1., 2014, pp. 58-62. https://www.tandfonline.com/doi/abs/10.1080/12269328.2014.889267

Tang, C. F. (2008). A re-examination of the relationship between electricity consumption and economic growth in Malaysia, *Energy Policy*, Vol. 36., No. 8., 2008, 3077–3085. https://www.sciencedirect.com/science/article/abs/pii/S030142150800219X

Tang, C. F. (2011). Is the tourism-led growth hypothesis valid for Malaysia? A view from disaggregated tourism markets, *International Journal of Tourism Research*, Vol. 13., No. 1., 2011, pp. 97-101; https://onlinelibrary.wiley.com/doi/epdf/10.1002/jtr.807

Tang, C. F., Abosedra, S., (2014). The impact of tourism, energy consumption and political instability on economic growth in the MENA countries, *Energy Policy*, Vol. 68., No. C, 2014, pp. 458-464. https://www.sciencedirect.com/science/article/abs/pii/S0301421514000093

Tang, C. F., Abosedra, S., (2016). Tourism and growth in Lebanon: New evidence from bootstrap simulation and rolling causality approaches, *Empirical Economics*, Vol. 50., No. 2., 2016, pp. 679-697, https://link.springer.com/article/10.1007%2Fs00181-015-0944-9

Tang, C. F., Tan, E. C., (2013). Exploring the nexus of electricity consumption, economic growth, energy prices and technology innovations in Malaysia, *Applied Energy*, Vol. 104., No. C, 2013, pp. 297-305, https://www.sciencedirect.com/science/article/abs/pii/S0306261912007805

Tiwari, A. K., Ozturk, I., Aruna, M., (2013). Tourism, energy consumption and climate change in OECD countries, *International Journal of Energy Economics and Policy*, Vol. 3, No. 3, 2013, pp.247-261. http://openaccess.cag.edu.tr/xmlui/bitstream/handle/20.500.12507/427/%C4%B0lhan%20%C3%96ZT%C3%9CRK.pdf?sequence=1&isAllowed=y

Vidyarthi, H., (2013), Energy consumption, carbon emissions and economic growth in India, *World Journal of Science, Technology and Sustainable Development*, Vol. 10, No. 4, 2013, pp. 278-287, https://www.emerald.com/insight/content/doi/10.1108/WJSTSD-07-2013-0024/full/html

Yorucu, V., & Mehmet, O. (2015). Modeling energy consumption for growth in an open economy: ARDL and causality analysis for Turkey, *International Journal of Green Energy*, Vol. 12., No., 12, 2015, pp. 1197-1205, https://www.tandfonline.com/doi/abs/10.1080/15435075.2014.893437?journalCode=ljge20

Institutional sources

European Commission (2018). Final energy consumption by sector. Retrieved 15 January 2020 from https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&plugin=1&pcode=ten00124&language=en

European Commission (2020), Tourism statistics - annual results for the accommodation sector, Retrieved 15 January 2020 from https://ec.europa.eu/eurostat/statistics-explained/pdfscache/37341.pdf

European Commission, News, Retrieved 17 May 2020 from https://ec.europa.eu/info/news/preparing-future-eu-strategy-energy-sector-integration-2020-apr-14_en

UNWTO (2018). *European Union Tourism Trends*, UN World Tourism Organization, Madrid; https://www.e-unwto.org/doi/pdf/10.18111/9789284419470,

The World Bank, World Development Indicators, Retrieved 15 December 2019 from https://databank.worldbank.org/source/world-development-indicators#

Government of Albania, National Energy and Action Plan, June 2003, updated April 2005.

Government of Montenegro, Ministry of Labor and Entrepreneurship, Energy Development Strategy by 2030, May 2014.

Ministry of Mining and Energy, (2016): the Energy Sector Development Strategy of the Republic of Serbia for the period by 2025 with projections by 2030, Ministry of Mining and Energy, Republic of Serbia, Belgrade, 2016 https://www.mre.gov.rs/doc/efikasnost-izvori/23.06.02016%20ENERGY%20SECTOR%20DEVELOPMENT%20STRATEGY%20OF%20THE%20REPUBLIC%20OF%20SERBIA.pdf

Republic of North Macedonia: The Strategy For Energy Development of the Republic of North Macedonia until 2040, Final draft for public consultations, Oct. 2019; retrieved 21.8.2020 from http://economy.gov.mk/Upload/Documents/Energy%20Development%20Strategy_FINAL%20DRAFT%20-%20For%20public%20consultations_ENG_29.10.2019(3).pdf

UTICAJ MEĐUNARODNOG TURIZMA NA POTROŠNJU ENERGIJE: PANEL STUDIJA DRŽAVA ZAPADNOG BALKANA I EVROPSKE UNIJE

Tokom XXI veka međunarodni turizam beleži stalni porast, kao i rastući značaj za privredni rast i razvoj mnogih zemalja. Međutim, turizam, a posebno međunarodni turizam zahteva veliku količinu energije za pružanje usluga i proizvodnju proizvoda koji su neophodni za zadovoljavanje želja i potreba turista. Cilj ovog rada je da analizira uticaj međunarodnog turizma na finalnu potrošnju energije u državama Zapadnog Balkana i državama-članicama Europske unije (EU) u periodu od 2007. do 2017. godine. Rezultati regresione analize pokazuju da uticaj broja stranih turista na finalnu potrošnji energije zavisi od nivoa razvoja turizma. Istovremeno, rezultati pokazuju da stanovništvo i BDP po glavi stanovnika imaju važan uticaj na finalnu potrošnju energije u zemljama Zapadnog Balkana kao i u tranzicionim i razvijenim državama-članicama Evropske unije.

Ključne reči: *međunarodni turizam, potrošnja energije, strani turisti, stanovništvo, BDP po glavi stanovnika*