SVEUČILIŠTE U RIJECI
FAKULTET ZA MENADŽMENT
U TURIZMU I UGOSTITELJSTVU
OPATIJA, HRVATSKA

Energieeffizienz und Erneuerbare Energien - Potenziale für Anwendungen in der kroatischen Tourismusbranche

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- PhD „Economic impact of renewable energy sources in tourism destination” (2010)
- Scientific project „Renewable energy sources for eco-hotels and eco-tourism destinations” (2007 – 2013)
- Scientific project „Sustainable Energy Management in Hotel Industry” (2016 – 2018)
- study programme Energy Management in Tourism

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INTRODUCTION

Switching Fuels

Switching to lower-carbon fuels (eg from coal to gas) can reduce emissions. Moving from world-average efficiency coal plant to state-of-the-art gas can halve emissions if fugitive methane release is controlled, and can act as a 'bridging technology'.

Alternatives

Increasing use of renewables such as solar, wind and biofuels. Increasing use of nuclear power. Hydropower is currently the largest single RE contributor, but solar, wind and bioenergy are expected to experience the biggest incremental growth.

Reducing Demand

Reducing consumer demand is a key mitigation strategy. The level of demand reduction determines the size of the mitigation challenge facing the energy sector. Potential limitations from 'rebound effect' to be taken into consideration.

Regulatory Frameworks

Governments may facilitate an increased use of emission reduction options by creating an attractive fiscal and regulatory framework.

Investment in Technology

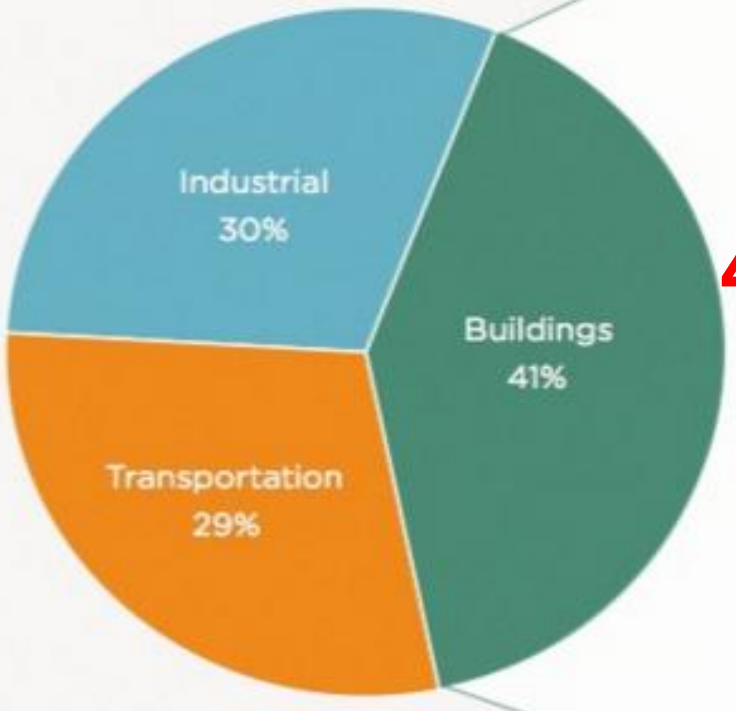
New technologies can be used for efficiency improvements, power generation, extraction, storage, transmission and distribution.

Carbon Pricing

For government and regulators, a key challenge will be to ensure a price of carbon that incentivises extra investment in low-carbon technologies.

https://www.worldenergy.org

ENERGY USE BY SECTOR



41%

22% Residential

26.5%	Space Heating
15.8%	Space Cooling
13.2%	Water Heating
10.0%	Lighting
6.3%	Refrigeration
4.8%	Electronics
4.6%	Wet Cleaning*
2.6%	Cooking
2.5%	Computers
13.5%	Other

*Wet cleaning includes washing machines, dryers and dishwashers.

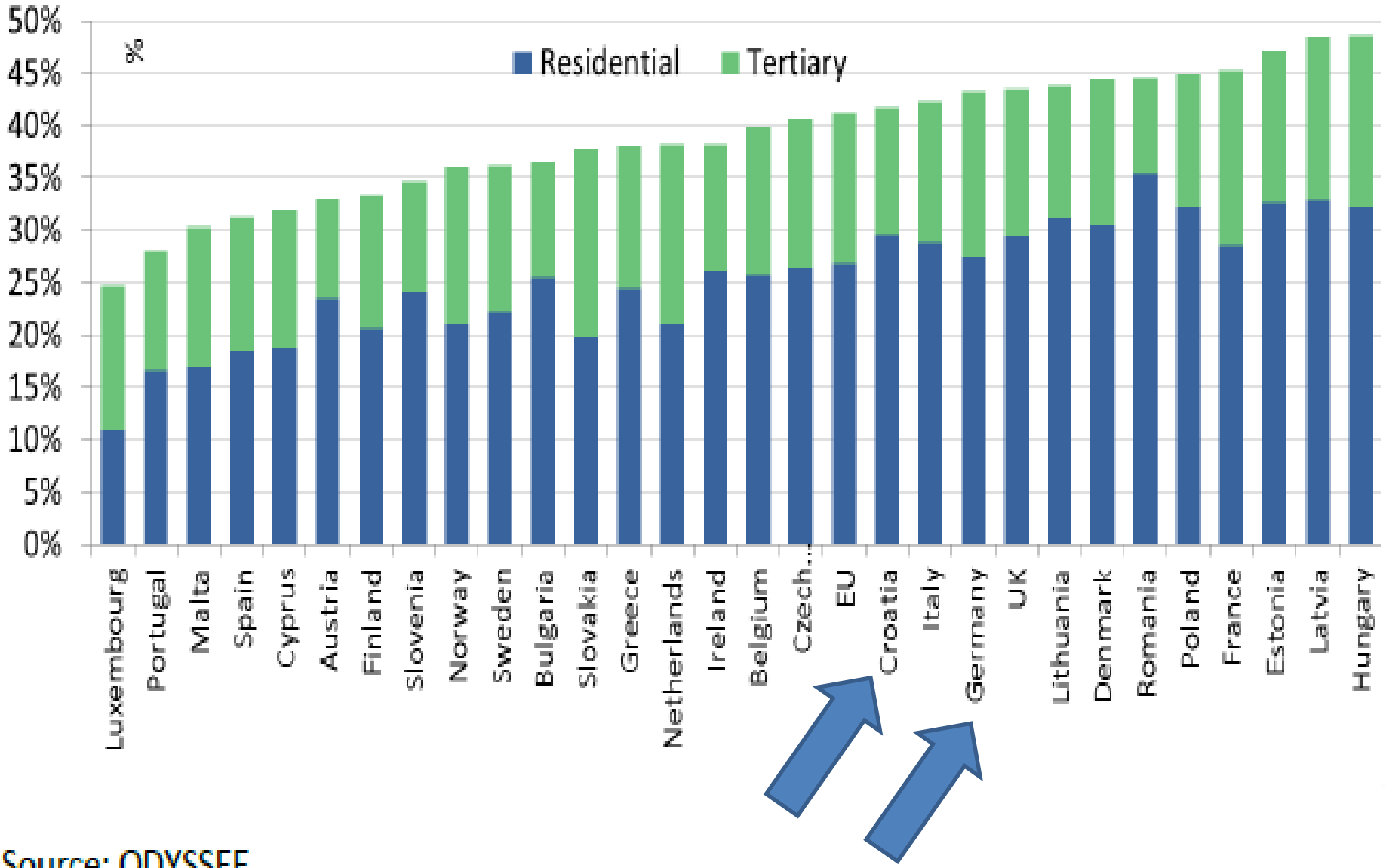
19% Commercial

17.4%	Lighting
13.7%	Space Heating
10.1%	Space Cooling
8.7%	Ventilation
6.7%	Refrigeration
4.5%	Electronics
4.3%	Water Heating
3.6%	Computers
1.4%	Cooking
13.8%	Other
15.7%	Adjust to SEDS**

**Adjustment to reconcile energy use estimates

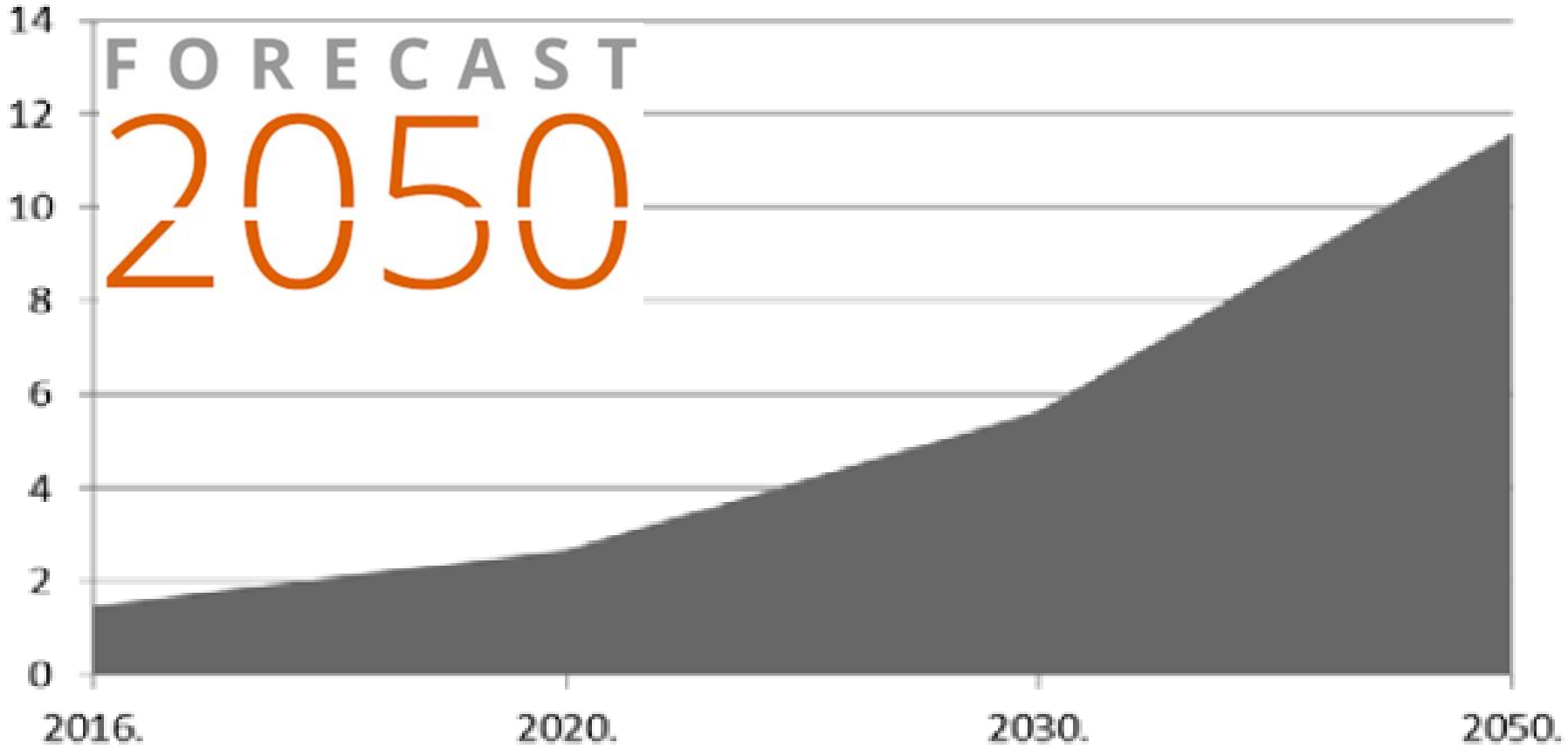
Source: U.S. Energy Information Administration and U.S. Department of Energy

Figure 1: Share of buildings in final energy consumption (2012)



Source: ODYSSEE

Power Conservation Potential (PJ) by Energy Restoration of Commercial Buildings



Source: REGEA, 2013

TOURISM – TERTIARY SECTOR

- Modern life is unimaginable without services such as health, social welfare, state administration…
- Due to the growth of the service sector in modern economies, the energy needs increase considerably with it and also the importance of its distribution and rational use
- Today's economy of the developed countries is based on the service sectors such as trade and tourism
- TOURISM IN THE REPUBLIC OF CROATIA – THE HOLDER OF THE ECONOMIC ACTIVITY

TOURISM

- The number of tourists affects the load in the peak of the tourist season
- It comes to a significant rise in the number of people in some areas in the summer months
- There is sudden increase in electricity consumption due to a temporary increase in the resident numbers

ENERGY CONSUMPTION
IS CONSTANTLY GROWING

Total categorized tourist facilities in Croatia

- Hotels 684
- Aparthotels 24
- Tourist resorts 47
- Apartmans 52
- Camps 167
- Marinas 66

1040 buildings

Source: MINT, 2017.

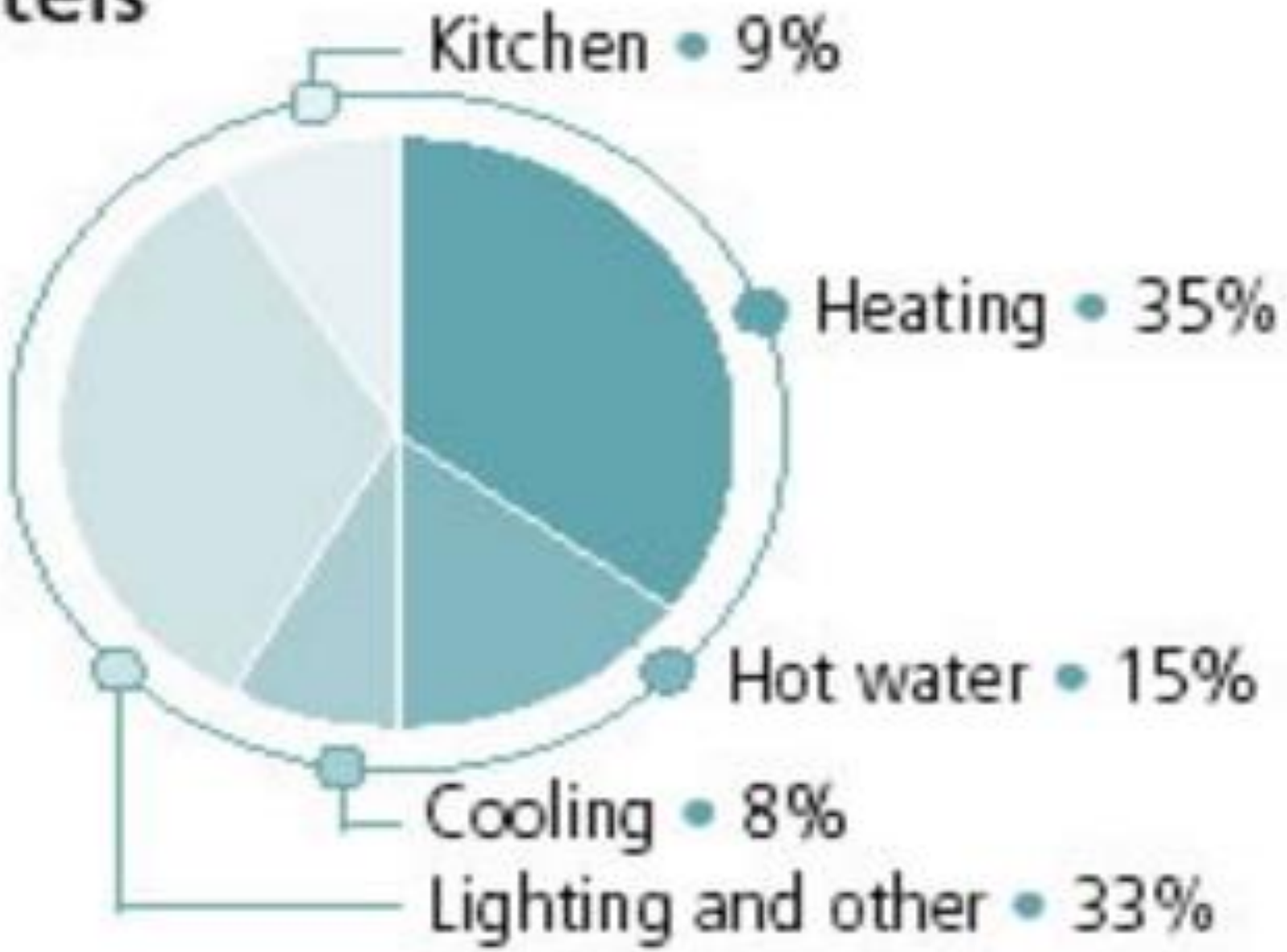
HOTELS IN CROATIA

2*	3*	4*	5*
75	317	256	36

HOTELS: large energy consumers

Hotels are ranked among the largest energy consumers in tertiary building sector (Dascalaki and Balaras, 2004.) This is due to their 24-hours-based operation (Deng, 2003.), the variety of facilities and functions provided (Deng and Burnett, 2000) and often reckless energy use habits of occupants (Santamouris et al., 1996).

Hotels

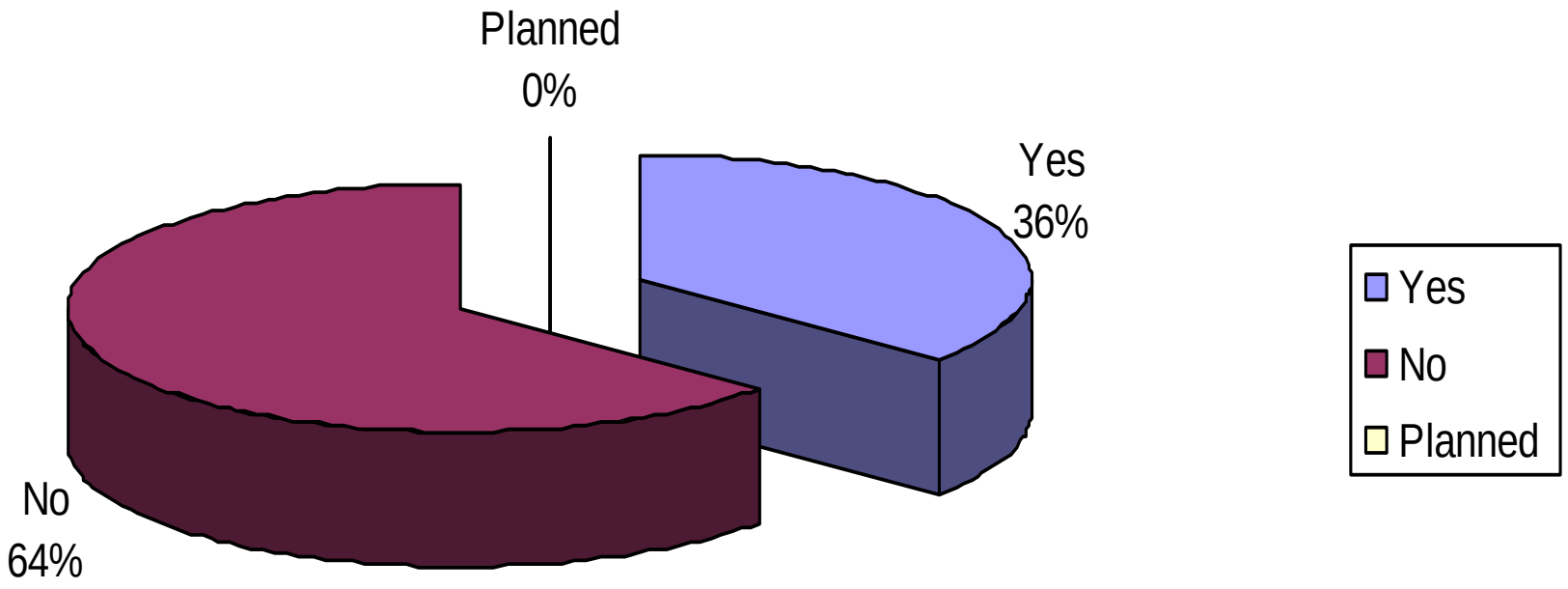

Kitchen • 9%
Heating • 35%
Hot water • 15%
Cooling • 8%
Lighting and other • 33%

RESEARCH IN TOURIST DESTINATION KVARNER

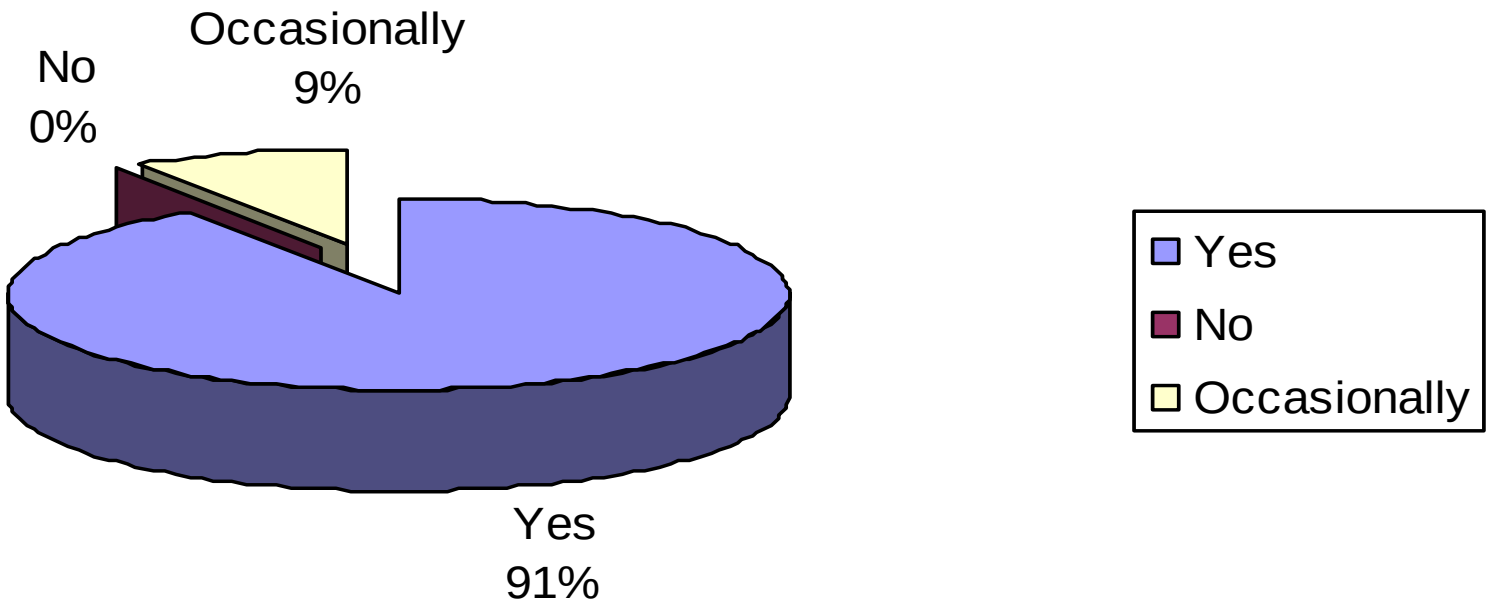
TOURISTS', INHABITANTS' AND MANAGERS' ASSESSMENT ON ELEMENT GROUPS OF AREA, RESOURCES, AND ENVIRONMENT

R. br	Elements of tourist offer	Tourists (1989 tourists)			Inhabitants (1807 inhabitants)			Tourism managers (257 managers)			Average		
Tourist destination Kvarner		2003	2006	2011	2003	2006	2011	2003	2006	2011	2003	2006	2011
1	Climate	4,50	5,22	5,92	4,01	5,05	5,45	4,20	5,44	5,90	4,24	5,25	5,76
19	Landscape beauty	4,45	5,78	5,97	4,27	5,27	5,74	4,49	6,40	5,90	4,40	5,61	5,87
20	Environmental preservation	4,05	5,28	5,59	3,54	4,68	4,90	3,63	4,94	5,56	3,74	4,98	5,35
21	Sea cleanliness	4,32	5,61	5,43	3,46	4,84	5,13	3,50	5,34	5,08	3,76	5,28	5,21
First group average		4,33	5,47	5,79	3,82	4,96	5,31	3,96	5,53	5,61	4,04	5,32	5,56

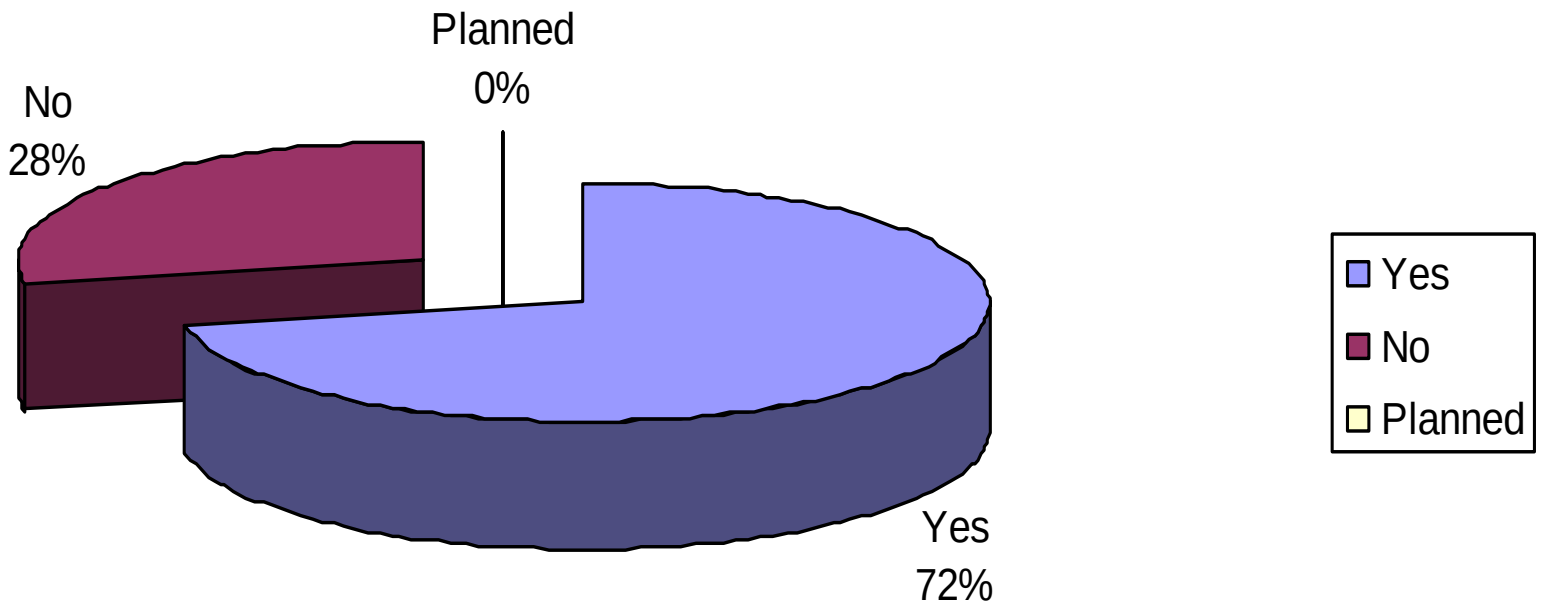
RENEWABLE ENERGY SOURCES USAGE IN HOTELS - MANAGERS RESPONSES



A PERSON EMPLOYED FOR ENERGY CONSUMPTION MONITORING



IMPLEMENTATION OF INTELLIGENT HOTEL ROOMS



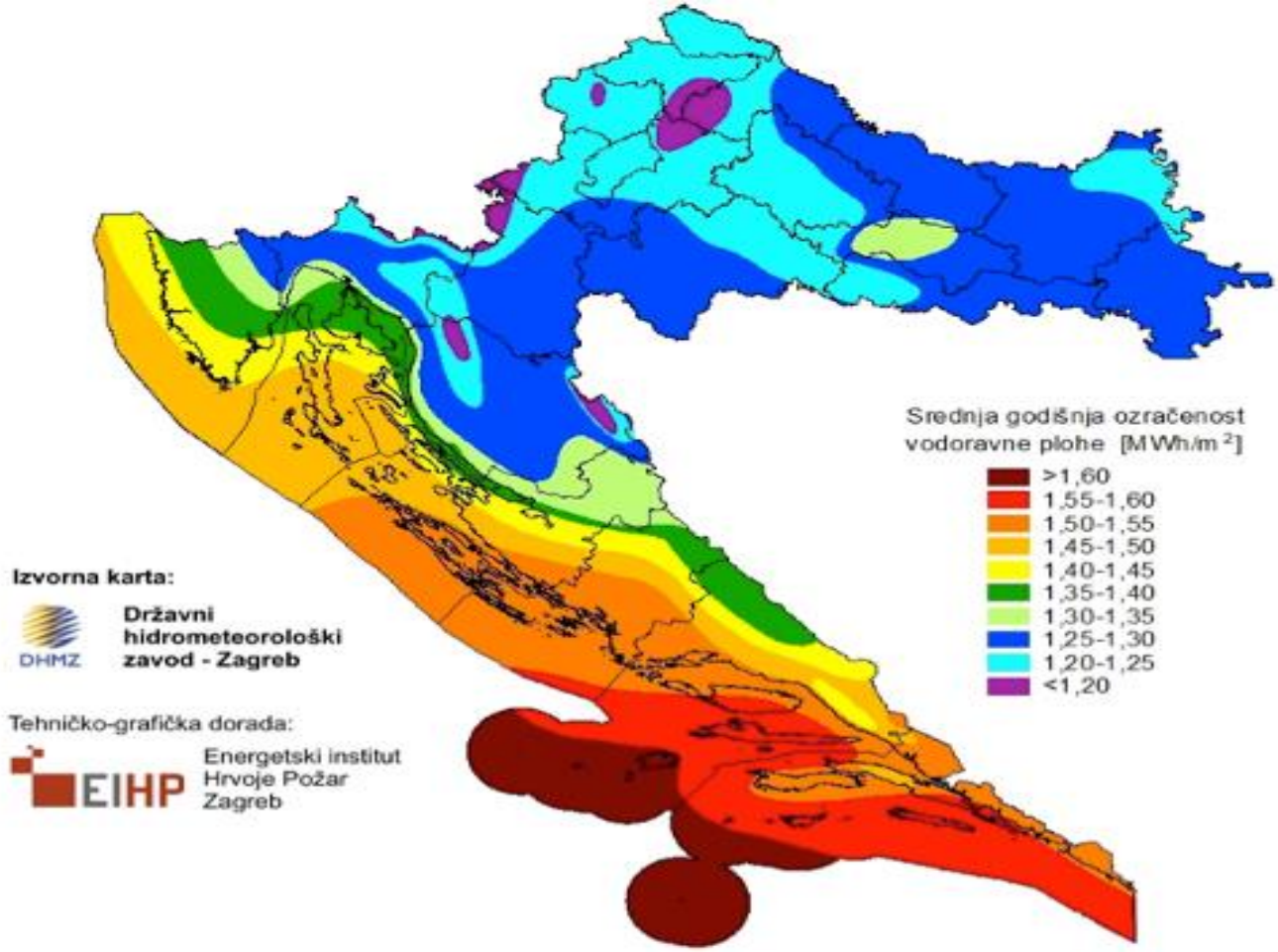
Managers responses

- ✓ lack of planning and investment for the introduction of energetically efficient technologies
- ✓ education and cooperation of energy experts and tourist experts
- ✓ adjustment of the regulation which has to do with energy industry and environment protection
- ✓ there is no sufficient financial incentive measures for stimulation of renewable energy sources
- ✓ initial price is very high: there is no cost-effectiveness in introduction and installation of new plants: places where RES are available should be used
- ✓ usage of renewable energy sources should be increased
- ✓ reduction of harmful matter emission into the atmosphere

Available sources of financing in the Republic of Croatia

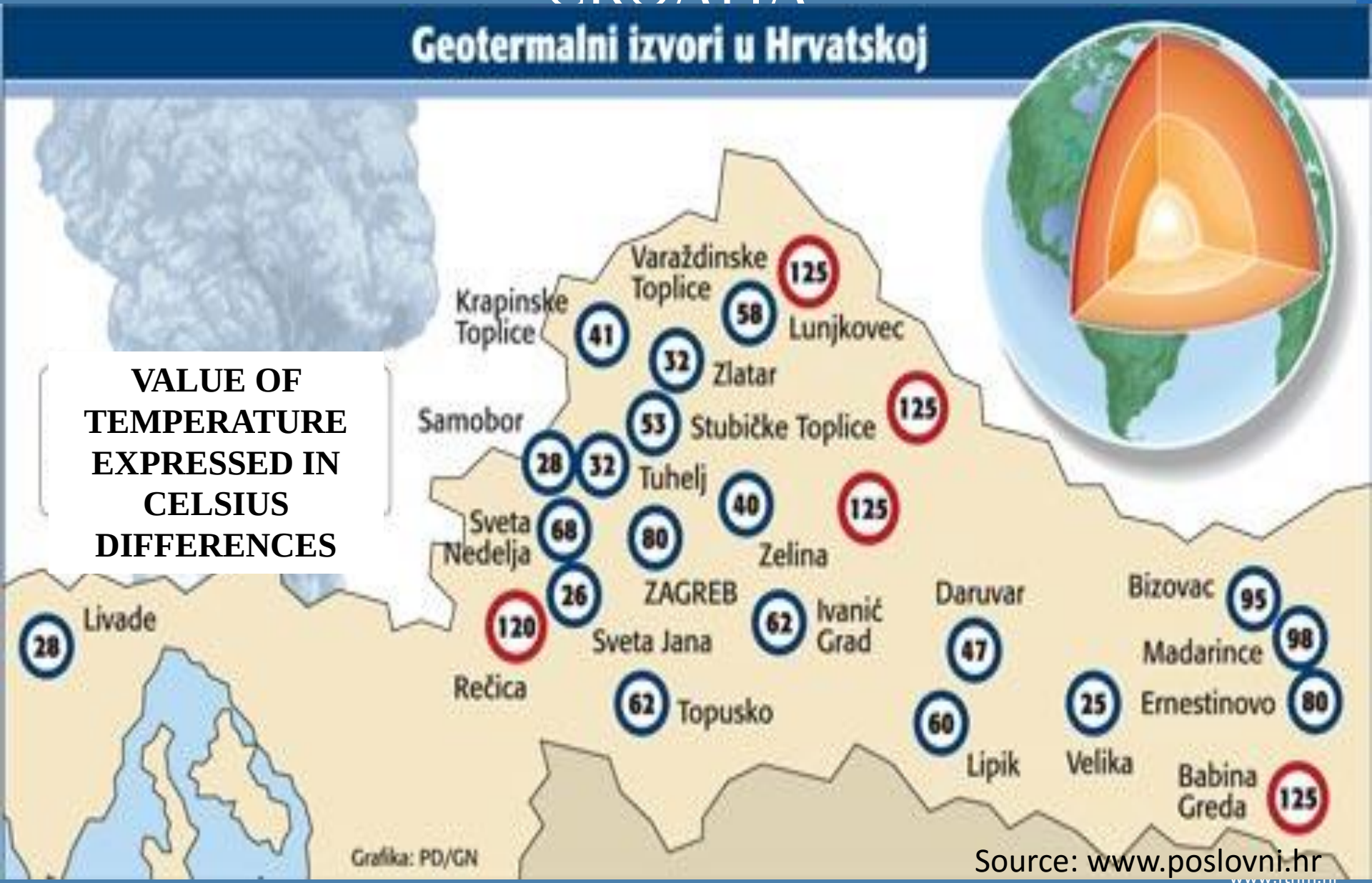
- HBOR
- FZOEU
- HAMAG INVEST (Croatian Agency for Small Business and Investment)
- EIB (European Investment Bank)
- EBRD (European Bank for Reconstruction and Development)
- CroPSSF Zelena energija (Croatian Private Sector Support Facility)
- WeBSEFF II(Western Balkans Sustainable Energy Financing Facility II)
- EU funds

POTENTIAL OF SOLAR ENERGY IN CROATIA



- Better conditions for use in relation to Central and Northern Europe
- Not behind for Greece and Spain
- Most installed collectors in Germany, Spain, Italy, France, Austria ...
- RH at the bottom of the list

POTENTIAL OF GEOTERMAL SOURCES IN CROATIA



Source: www.poslovni.hr

Installed capacities for heat and electricity generation from renewable energy sources in Croatia for 2014

OIE RES	Instalirana toplinska snaga Installed heat capacity (MW)	Instalirana električna snaga Installed power capacity (MW)
Sunce Solar	113,2*	33,5**
Vjetar Wind	0	339,3
Biomasa Biomass	515*	27,3
Male hidroelektrane Small hydro power plants	0	34,2
Geotermalna Geothermal	52,79 / 124,65	0
UKUPNO TOTAL		434

Izvor | Source: EIHP, HEP, Šumarski fakultet Sveučilišta u Zagrebu: Drvno-tehnološki odsjek, INA industrija nafte d.d. – Podaci za izradu Energije u Hrvatskoj – geotermalna energija, WGC 2015 – Croatia Country Update 2015 and On – Kolbah i ostali | EIHP, HEP, University of Zagreb, Faculty of Forestry – Department of Wood Processing, INA industrija nafte d.d. – geothermal energy, WGC 2015 – Croatia Country Update 2015 and On – Kolbah & others

* procjena | estimation

** sustavi priključeni na elektroenergetsku mrežu | systems connected to the grid

ECONOMIC IMPACTS OF RENEWABLES IN TOURISM - BENEFITS

Economic impacts macro view	Economic impacts micro view	Economic impact consumers	Social impacts	Institutional impacts
Secure energy supply	Increased productivity	Employment	Increased living standards	Democracy process.making
Regional economic growth	Improved competitiveness	Creating revenue and wealth	Social cohesion and stability	Public participation
Enhanced regional trade balance	Mobility of work and population	Induced investment	Migration Effects	Solve local problems
Export potential	Improved infrastructure	Support to related	Regional developme	Implementation energy


increase
+
Profits
Competitiveness
Sustainability
Responsibility
Brand value
reduce
–
Costs
Energy consumption
Carbon footprint
Tourism impact on
Climate Change

Sustainable Hotel

CERTIFIED BY UPUHH

Legend: ● 11 sustainable hotels, ● 3 sustainable hotels, ● 2 sustainable hotels, ● 1 sustainable hotel

A new way of building: green building

Source: Sustainable development and energy efficiency, book 1, 2009

CONCLUSION

- ✓ European Ecolabel
- ✓ instrument for improving the environmental quality,
- ✓ Reduce costs,
- ✓ A valuable marketing tool to enhance the the hotel's image
- ✓ The Ecolabel criteria aim, in particular, to limit energy and water consumption, promote the use of renewable energy sources and promote environmental communication and education (Decision no.287/2003/EC).

THANK YOU FOR YOUR ATTENTION

INTERNATIONAL YEAR 2017

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