Institut for Economic Promotion, Austrian Economic Chamber, Vienna, Austria

T.E.I. Thessaloniki Greece

Department of Tourism Management

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RESTORABLE ENERGY SOURCES AS A FACTOR OF THE COMPETITIVE IMPROVEMENT ABILITY OF A TOURIST DESTINATION

Danijela Gracan
Romina Alkier Radnic
Sinisa Bogdan
University of Rijeka, Croatia[1]

Abstract: Energy supply represents not only the energetic and ecological undertaking factor of tourist economy bearers, but the factor of profitability and competitiveness within the foreign tourist market as well. Lower energy costs form the prerequisites for higher profit accomplishments, as well as better market price competitiveness.
Instead of exploiting natural resources, tourism should make the most of them, which brings into relief the directing of tourist economy subjects towards the use of restorable energy sources, particularly solar and wind energy. In spite of favourable climate features of Croatia, expressed in terms of insulation and wind-strength, the restorable energy sources are still used rather insignificantly. Some positive moves in such a trend are noticeable on the island of Pag and in the town of Sibenik, where the electric energy is obtained in wind power-plants. In accordance with the concept of sustainable development of tourism, both solar energy and wind-mill energy should represent the skeleton for the energetic supply of the Croatian tourist coastline in the future. And only then, with the right amount of energy and without dependence on the world energetic markets, Croatia can develop its own healthy economic and tourist future.

Keywords: restorable sources, passive energetic standard, competition.

[1] **Danijela Gracan**, Ph.D., Assistant Professor, **Romina Alkier Radnic** Ph.D., Assistant Professor, **Sinisa Bogdan,** B.Sc., Assistant, Faculty of Tourism and Hospitality Management, University of Rijeka, Croatia.

INTRODUCTION

The contemporary approach to the tourism development is characterized by the rational energetic and ecological consideration, as the part of the sustainable development concept. This includes the implicit application of differential restorable energy sources (bio-mass, geo-thermal energy, sun energy, wind), as well as the implementation of specific energetic and ecological methods of projection and building technologies, when, subsequently, due to the contemporary drafting solutions, energetic effective materials, and the equipment elements, the energy is economized and the considerable ecological contribution (passive houses) is obtained.

By making good use of natural resources rather than taking advantage of it, along with the highly developed senses of their significance among all those included in the tourist events, the contribution is made to the concurrency of the tourist destination, with its development based on the naturally preserved surroundings and therefore purposefully using the appropriate energy sources. The energy economizing is nowadays oriented towards the application and promotion of clean technologies, energetic efficacy and the use of restorable energy sources, consequently aiming at surroundings protection. Simultaneously, this should be the orientation of the tourist destination as the energy consumer. Therefore, the implementation of the contemporary measures of the energetic efficacy as well as the use of the restorable energy sources should be one of the developing lines of direction of any tourist destination.

1. RESTORABLE ENERGY SOURCES IN CROATIA AND IN THE WORLD

The more and more pronounced raise in value of fossil combustible as well as the exploiting of their sources both indicate the necessity of replacing the restorable energy sources for the conventional energy sources.

The worldwide energy consumption for the period from 1995 through 2005 shows the average annual growth of 2.4%. The world energy production grew from 34.5 trillion kWh to 43.6 trillion kWh in 2005. Oil and oil derivates remained the most important energy sources in 2005, participating with 36.8% in the total amount of the primary energy sources, although this represents somewhat lower part than the one in 1995 (39.0%).[2] Simultaneously, a big step forward was obtained in use of the restorable energy sources, particularly in wind energy. Harnessing of geothermal, solar and wind energies, as well as the bio-mass for the period from 1995 through 2005 obtained considerable growth from 172 billion to 370 billion kWh, i.e. a growth of 115.1%, participating with a share of 0.93% in the total world energy production for the year 2005 (the 1995 participating share was of 0.6%).

Aggressive promotion in building and use of sustainable energy sources brought to different significant results. Wind use in energy production is becoming energetic reality, followed by the required capacity construction. The correlation of the

[2] International Enery Annual 2005, http://www.eia.doe.gov/iea/overview.html (2007-09-12)

technological development and the possibilities of commercial use bring to the growth in installed energy, noise reducing, and lower costs of wind power-plants, as well as to the better application of sun energy (consumer water heating, obtaining of electric energy, internal space heating, …). If particular restorable energy sources are contemplated, the following effects can be observed:[3]

- ***wind:*** increase of windmill construction brings to the growth in power units and decrease in investment costs,
- ***bio-mass:*** applicable in electric energy production, heating, and traffic, with achievements in the technological progress,
- ***sun:*** increase in in-built collectors with the average annual growth of 13%, and in solar cells of 27%. The dominant construction technology of solar cells consists of use of silicon, with constant grow of new ideas, as, for instance, the utilization of amorphous rather than crystal silicon, cells in copper-indium–gallium-selenium (CIGS), dye-sensitized solar cells, and flexible solar cells**,**
- ***geo-thermal energy:*** growth in capacity of 44% for the passed period, in electric energy production of 48%, in thermal capacities of 76%, in space heating production of 70%,
- ***small hydro–power plants****:* constant growth in production with minimal changes in technological development.

The Strategy of Energetic Development defines the goals of using the stated restorable energy sources in Croatia. In accordance with the general trend in the countries within the European Union the overall produced energy from the restorable sources is predicted to grow from 75 PJ in 2000 to 100-160 PJ (depending on the suggested scenario) in 2030.[4]

Researches show that only the smaller amount of the disposable bio-mass is used in Croatia, although it disposes of conspicuous bio-mass potential for the production of energy. With production of energy from bio-mass and waste up to the 15% of the total consumption of the primary energy could be provided for until 2020, for which real potential exist in Croatia.

Solar energy is considerably less used in Croatia than its natural and technical possibilities allow. Researches show that the solar energy use in combination with the liquefied natural gas and/or natural gas represents technically and ecologically acceptable solution for the Croatian coastline. In accordance with this, hybrid combination of solar energy, wind energy, and the liquefied natural gas can not only contribute considerably to the solution of energetic infrastructure on islands, but start the development of traditional island activities in accordance with the strategic trend of the Croatian islands development.

[3] Granic, G. i dr.: Energetski sektor u razdoblju od 1990.–2005.: analiza i posljedice, Zbornik radova "Energetske perspektive danas i sutra: svijet – Europa – Hrvatska", Hrvatsko energetsko drustvo, Zagreb, 2005., p. 18.
[4] Strategija energetskog razvitka, http://www.eihp.hr (2007–09–14)

The wind energy represents an ecologically acceptable and available energy source in Croatia. When analyzing the technical potential of wind energy in 29 different micro-locations (19 of them on Adriatic islands and on the peninsula of Peljesac, and 10 on the Adriatic coastline), the possibility of building the wind power-plants of 400MW power (with use of wind-turbines of 750 KW power) is estimated, which could produce annually approx. 800 GW of electric energy. The use of wind-energy can contribute considerably to the partial sufficient supply of the energetic needs in Croatia. The positive trends are noticeable on the island of Pag and in the town of Sibenik, where the electric energy is produced in wind power-plants.

The total geo-thermal potential of the located deposits in Croatia amount to 839MW of thermal energy and 47.9 MW of electric energy. The harnessing of geo-thermal energy implies the forming of adequate conditions for the growth in its use in the existing plants as well as in the education and in the marketing campaigns in order to obtain interest among undertakers and within the local community.

Local resources for energy production in small water power-plants are under-utilized. There are approx. 350 technically useful circuits in Croatia, with their energetic potential evaluated at 570 GWh. Their greater use understands the elimination of all legislative barriers and the forming of stipulations for the increased construction.

One of the reasons for the low level of restorable energy sources within the energetic system of Croatia is without doubt the high consumption price of this sort of energy. Therefore their implementation depends primarily on administrative support and stimulating measures. Nevertheless, the utilization price of energy obtained from restorable sources does not include the real environmental protection price, which should be calculated as an objective expenditure within all the production technologies, transformations and energy use, which would reduce considerably utilisation price of energy obtained from restorable sources in relation to the conventional energy sources. In order to obtain increase in energy from restorable sources production, Croatia must develop a system of economic, financial, fiscal, legal, administrative, technical, and organizational measures. The necessity to develop legislative and trade frames is essential, as well as the comprehension of industry and economy, education, research stimulation and international collaboration. By active energetic policy the increased use of every particular restorable energy source is enabled with additional positive effects achievements.

2. PASSIVE ENERGETIC STANDARD AS THE FACTOR OF SUSTAINABLE TOURISM DEVELOPMENT

The increase in personal standard of population, accompanied by the tourist growth standard, particularly in construction and equipment of tourist objects, by space heating and cooling of all premises, leads to the growing need in energy. Such a trend is clearly going to continue in the future. The impact possibilities on energy consumption level in tourism are great, and can comprehensively be divided into two main groups. The first group consists of material and technology consumption in

construction which reduces the energy consumption, while the second group consists of the restorable energy sources and their use.

Statistical data show that approx. 83% of buildings in Croatia have no adequate heating insulation, while 50% have none at all. As a rule, it is possible to decrease the amount of internal heating energy up to 60-70% if adequate heating insulation is applied to already existing buildings, as well as to decrease the cooling needs significantly in the summer months.

With energy loss reduction in heating and cooling, the increase in energetic efficacy is obtained.

When constructing new buildings for the use of tourism, particularly on islands or in the function of rural tourism, the induction of passive energetic building standard in construction business seems interesting. This means complying the energy consumption criteria in space heating according to the definition of a passive house, at or bellow 15 kWh/m^2 (with the assumption of the adequate highly valuable heating insulation, use of a heating pump and the ventilation system which brings fresh air continually into the internal space), and use of obtainable restorable energy sources in a passive active way for water heating (low-temperature systems – sun thermal transformers) and for electric energy production (photo-voltage cells).[5] This popularly called "house without heating" has no active conventional (fossil) energy source heating system, but uses internal heat sources (a person, a heat releasing device, the accumulated heat within a construction, etc.), including sun energy radiating gains, and earth heat (or coolness). Consequently, it forms an energetically independent house, which means it acquires heating, cooling, hot water and light from sun energy alone.

The research project – the European Union programme: Cost Efficient Passive Houses as European Standards (CEPHEUS) has confirmed the energetic and economic efficiency of such architecture and construction in more than 250 exemplars in Germany, France, Austria and Switzerland, and the passive house model ("a house without heating") has been proposed as a building standard for the housing architecture and for all functional object models in general. The first passive house in Croatia was erected in 2005 in the town called Bestovje (Rakitje) near Zagreb. If the energetic consumption of a passive house of only 30 kWh/m^2 of total annual needs (electric energy for lighting and devices need, water and internal space heating, internal heating up to 15 kWh/m^2 annually) is compared to the existing old buildings with the overall annual consume of 250 to 300 kWh/m^2, more that 220 kWh/m^2 of which on internal heating alone, the very low energetic consumption of the passive house must be acknowledged, together with the possibilities of its application in tourism, especially having in mind the energetic problems of the Croatian islands and Croatia as a whole.

The perception of great energy economizing possibilities and the even greater ecology awareness of all the participants in the building process is confirmed by the trend of passive houses construction in developed countries throughout Europe. Nevertheless, such a trend has not yet been observed in Croatia, which can be attributed

[5] Prva pasivna kuca u Hrvatskoj, http://www.gradimo.hr/4536.aspx (2007-09-09)

to the pre-war standard decline, to the war, as well as to the current lower post-war standard, and, on the other hand, to the lack of knowledge, awareness and responsibility of both institutions and individuals. This results in poor quality construction, both energetically and ecologically. Such kind of construction is present in the segment of tourist construction as well. The hotel objects, mainly designed for seasonal undertaking, have no adequate heating insulation, therefore the energy consumption for heating being up to ten times greater than in the standard passive house, accompanied with inadequate heating comfort and by greenhouse gas emission.

The implementation of the passive energetic standard in the tourist industry construction requires the state subsidy, as well as the change in the energetic strategy concept. The ecologically acceptable construction, with small additional initial investments (10% of the classic construction costs), and its profitability with regard to the technology development, irrepressible growth in conventional source energy price, as well as the stimulating financing and promoting of such a constructing standard (tax exemptions), would enable quicker tourist objects investment reimbursement and their profitability.

With passive energetic standard the suppositions are formed for the tourism development in accordance to the sustainable concept development. With use of restorable energy sources the preferences of the passive house are obtained not only for their users – tourists, but for the surrounding as well. Considering it does not use fossil energy sources, there is no CO_2 emission, which, consequently, contributes to the tourist resource preservation. With biological and landscape diversity, and with quality of environment, the competitive preferences are obtained on a global tourist market.

3. RESTORABLE ENERGY SOURCES AS THE FUNCTION OF COMPETITIVE PREFERENCE IMPROVEMENT OF THE TOURISM DESTINATION

In spite of all positive tourist results, accentuated by a number of tourist arrivals and tourist overnight stays, and by the tourism income that shows a growing tendency every year, Croatian hoteliers (as key bearers of the tourist development) are confronted with non-profitable management, with as many as 10% of tourist firms registering losses. Such business results offer no possibility for crucial quality improvements within the hotel industry, with negative influence on the Croatian tourism competitiveness within the tourist market. Natural resources, local culture, assortment, and offer quality, as well as the cultural and the historical inheritance represent the adequate resources needed by the tourist destination in order to build and establish its recognizability and competitiveness.

Environmental preservation and protection represent the most important forms of commitment in all the present-day tourist development segments, which represent the assumption of the competitiveness as well. The competitiveness of a tourist destination is obtained by offering the high quality to the market, and, simultaneously, neutralizing the ever present negative concurrency pressure. In such context similar but improved activities must be developed, as well as the activities that distinguish the

destination from its concurrency. The concurrency represents the only way of maintaining the long-term progress. Nevertheless, the tourism development creates the costs that must be minimized, particularly the ones that decrease the physical and psychical perception of prosperity of local inhabitants. Therefore it is essential to avoid the quality interruption of the physical surrounding and of the local identity.

Environmental devastation, as the result of a long-term uncontrolled valorisation of tourist resources has a recurring effect on the tourist development. One of the reasons for the environmental devastation is clearly represented by the use of the conventional energy sources (the CO_2 emission, etc.).

The image of the ecologically illuminated destination enables its posing on a tourist market and forming the clear picture of a certain destination with the concept of a generational tolerance within the potential guest groups. This is possible if the tourist destination takes care of its surroundings, which is obtainable with lower non-restorable natural resources investments and even lower surroundings burdening.

Subsequently, the use of the restorable energy sources in tourism means the increase in energetic efficacy and the decrease in managing cost of the tourist company, which consequently brings to the profit increase.

The Croatian coastline and islands, where the most of the tourist accommodation capacity is concentrated, has good solar potential, as well as good wind potential for the application of both wind and solar energy. Two wind power-plants were erected on the island of Pag (the first wind power-plant in Croatia was erected in the Ravne region above the city of Pag) and in the town of Sibenik (the wind power-plant “Velika Glava”, with planned annual production of 40-50 GWh, enough to cover the consumption of 10.000 average households). The construction of wind power-plants usually has very good ecological performances, and, as the consumption of fossil fuel within the energetic system of Croatia is decreased with their erection, their noxious influence on surroundings is diminished. Nevertheless, it must be taken into account that, apart from their positive impact, they have the harmful influence on surroundings, markedly in changes in the landscape value, impact on flora and fauna, and in noise impact.

Besides large wind power-plants, the application of smaller wind power-plants for irrigation in river deltas and lakes (exp. the Neretva river delta), or for the pump energy supply in irrigation and water desalinization (the example of the wind-park Stupisce on the island of Pag) is possible

In spite of good solar potential it could be taken for granted that due to the high construction costs no solar formation is going to be built in the forthcoming years. Nevertheless, solar heating collectors for hot water production can find intensive use, whether in different tourist objects, or in insulated regions and in various specific appliances (for instance, in basic telecommunication stations, light-houses, traffic signs, lightening, different monitor systems, etc.).

As preserving the natural potentials of a tourist destination forms its competitive preferences, the future development of a tourist destination must be oriented towards it, with the use of restorable energy sources forming the irreplaceable segment of the same process.

CONCLUSION

The energy supply is one of the managing factors of the tourist economy bearers, its profitability and concurrency on the foreign tourist market. With use of restorable energy sources the energy costs are decreased, the prerequisites formed for larger profit achievement and for possibilities to achieve better price competitiveness on the market.

With introducing of the passive energetic standard in the tourist object construction the energetic cost are minimized, and, at the same time, the prerequisites are formed for a comfortable stay within tourist objects. The tourist objects being considerable energy consumers, such an innovative construction enables the increase in economic effect with management cost decrease, as well as improving of a position of a tourist destination on the market when its image of an ecologically illuminated destination is presented. Nevertheless, for such a construction to obtain better results, the simulative legislative regulations and various different stimulating measures must be acquired. With active energetic policy the increased use of every single restorable energy source is enabled, and thus the additional positive effects obtained.

With support of the Environmental Protection and Energetic Efficacy Fund in 2005 the stimulation of the energetically efficacious construction became established, which brought to the new, stimulating era of energetic efficacy in ecological and sustainable construction.

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