KOSTOLAC- THE ROAD TRAVELLED FROM A SMALL MINING PLACE TO A MODERN ECONOMIC CENTER

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Abstract. Coal mines in Serbia have existed since the Middle Ages, but they were short-lived or had long breaks in exploitation activity. Kostolac is the only one which has worked steadily since it was opened. Last year (2010) was noted for 140 years of activity at this mining company, and the archaeologists who were exploring Viminacium and the town of Branichevo found out that coal was extracted here during the Roman period. The town of Kostolac itself was first mentioned in the documents dating from 1380. The old mining settlement was founded in the second half of the nineteenth century, more precisely, the organized coal extraction began in 1870. It was the moment when the spreading of the settlement began and the number of people, who came looking for a job, began to grow. For that reason the ethnic structure of this place is still very, diversified. The development of this settlement was certainly been favored by the construction of roads and railway as well as by the most profitable waterways on the Danube, which is considered to be the most important European river. Thanks to coal mines, the village of Kostolac grew into a mining place in which people were working in the mill, brick plant and glass factory. Until now Kostolac has made a significant progress. The main features of Kostolac refers to the fact that it is a mining town, a town of electric and coal fired power plant. Kostolac is a place with multi-ethnic structure which together and harmoniously builds its economic foundations and increasingly invests in education and professional training of personell employed in the production of coal and energy. Special attention is given to projects regarding protection and preservation of the environment. Its rich history has made it an important archaeological and cultural center in southeast Europe.

termocentralelor. Kostolac este un loc cu o structura multi-etnică a populației, care împreună și armonios au construit fundațiile economice, investind din ce în ce mai mult în educarea și formarea profesională a personalului angajat în producția de cărbune și energie. O atenție specială este acordată proiectelor privind protecția și conservarea mediului. Datorită bogatei sale istorii a devenit un important centru cultural și arheologic din sud-estul Europei.

Keywords: economic development, coal basins, coal electric power plant, Kostolac
Cuvinte cheie: dezvoltare economică, bazine miniere, termocentrale, Kostolac

1. INTRODUCTION

The more distinctive and demanding modern industries are compelling many countries to transform the geographic space and adapt to new conditions. This paper exposes the basic natural and social characteristics of Kostolac that have turned this small place into an important economic center of this part of Serbia. Its remarkable position, historic and cultural heritage, rich ethnic structure and coal mines with a long coal extraction tradition are some of the advantages of Kostolac. The paper shows the function of the economic company, ”Thermo-power Plant and Excavation Site Kostolac” and its transformation and development through history. What makes this economic company specific is that it is the only one in the system of Electrical industry of Serbia which comprises the production of electric power and coal within one company. Power plants and excavation site Kostolac can take pride in a 140 year long tradition in coal production and 60 year long tradition in the production of electric power. Owing to constant investment in upgrading the production and increasing energy efficiency, this company is achieving greater results. The company is trying to overhaul all fault lines and realize environmental projects which are in progress so that the issues of air, water and soil pollution could be solved. While travelling this long and rough road from a small mining settlement to the one that is the most essential factors of energy system of Serbia, the company “Thermo - power Plant and Excavation Site Kostolac,” had to be aware of technical and technological equipment needed, professionals and their further education, reasonable prices and competitive products.

2. NATURAL CHARACTERISTICS AS A BASIS OF ECONOMIC DEVELOPMENT

The position of Kostolac is one of the basic and undoubtedly the most valuable characteristics, which enables this place to develop. It is located in the per-Pannonia part of northeast Serbia, where Požarevačka greda, the most northern section of hilly terrain, east to Velika Morava, slopes down to the banks of the Danube and connects the fertile regions of the Danube and Morava Basins and Stig.

The town of Kostolac is located at the altitude of 75m. It occupies the area north to Požarevac, and south to Veliko Gradište between Stig in the east and the Morava Basins in the west. In the vicinity of Kostolac there are a few villages which gravitate to it. Those are: Ostrovo, Petka, Klenovnik, Stari Kostolac Drmno and Ćirikovac. The wider
surroundings of Kostolac include Braničevo, Stig, Zvižd Homolje (Deurić et al., 2003, p. 8).

To the north it borders to the Danube, to the east and southeast to the Homolje and Kučaj Mountains, and to the west to the slopes of Šumadia hilly terrain. The geographic position of this area, its openness and its good network of roads, railway and water transport with other parts of Serbia as well as its direct leaning against the district of Belgrade offer significant advantages to its economic development.

It is 11 km from Požarevac with which it is connected by asphalt road. It is 90 km away from Belgrade and 25 km from the highway. Apart from very good connections by road, Kostolac is connected with Požarevac and Belgrade by a railway line which operates as industrial track for the transportation of lignite. Since 1962 this railroad has not been of any importance for passenger transport due to strong development of motoring and road traffic (Arsenijević, B., 1999, p. 15). However, there have been some corrections here and in 1994 passenger railway transport was reestablished. The town of Kostolac is connected by waterway on the Danube. This communication provides passenger as well as freight transport, but for the present there is no regular timetable. The traffic on the Danube is an important communication for water transportation as the most rational one, but for the time being the capacities are not used enough. There is a lack of organized space, piers and means of transport so that this form of transport is yet another chance and perspective of Kostolac. The location of the town is even more favorable for its nearness to the rivers the Morava and Mlava and the canals which can be used for various economic and recreation purposes. The town of Kostolac gravitates toward Požarevac, which defines its administrative and territorial affiliation to the town of Požarevac. Kostolac was an independent municipality for some time, but by the improvement of the communal system its independent existence ceased.

The relief of this entirety is characterized by the existence of a terrain reef named Sopotska greda which stretches north-south, from the Danube via Klenovnik and Cukovica, toward Požarevac, and further on up to Resava and the surroundings of Svilajnac. The highest peak is 175 m above the sea level and that is between Kostolac and Ćirikovac. Going further to the north the height and the width of Sopotska greda gradually decrease and near Kostolac it ends in a cape 104 m high. In the east, toward the river Mlava valley, Sopotska greda slopes rather steeply into alluvial plain of this river, to 80 m altitude. In the west and northwest it slopes towards the Danube and the Morava. The slope on this side is less steep, turning into flat area along these rivers, with the altitude 72 m. Sopotska greda belongs to tertiary whereas the valleys of the Danube and the Mlava belong to diluvium i.e. alluvium. In the north this relief includes the Danube isle called Ostrovo. Ostrovo is 24 km long and 2 to 4 km wide. Most of the island lies below 72 m under the sea level. On the grounds of geological composition and relief, it was concluded that it is the product of fluvial accumulation which occurred after all tectonic movements had ceased presumably in the early quarter (Arsenijević, B., 1999, p. 19). The existing geo-morphological motifs increase the appeal that this area possesses in regard to touristic attractions. It is about Sopotska greda and the changes that it is undergoing, but also about the obvious change of the relief and creation of the new configuration of the terrain, new clearings, hills and habitats for plant and animal species. The opulence of the flora has immeasurable recreational values due to its physiological properties and processes going on. The fauna is as much attractive for the possibilities of sport and entertainment activities such as: hunting
The area of Kostolac as a part of the south rims of the Pannonia Basin has moderate continental climate with noticeable effects of the steppe-continental climate of Banat (Dukić, D., 1977, p 244). The climate like this differs significantly from the more stable humid climate and consequently requires from the farmers more knowledge and skills in applying scientific farming in order to maintain humidity of the soil. The most suitable conditions of life are relative humidity of the air of about 60 % and the air temperature of 20 °C. Proven that the conditions like these are possible in the period from May to October, some actions should be taken so that a longer and more comfortable stay of tourists in this touristic attractions rich area could be provided. This requires certain funds, but if the tourists are supposed to stay longer, feel comfortable and come again, some measures should be taken, which Kostolac certainly is doing.

The nearness of European corridor VII – the river Danube with the waterfront which makes the northern part of the district, it has been from the earliest time a strategic district interesting for building settlements and working, transit (west-east) and a meeting place of interests of great empires. There is a lot of historic and cultural evidence about this, but the most important is “Viminacium”, which confirms the existence of a culture dating back to the Bronze and Iron Age.

As the main geographic direct rice, the Danube- Morava corridor with its special predispositions, along with the intensive economic and infrastructure activities, stands for the basic foundation of the development and integration of the state of Serbia in the environment of southeast Europe (Vemić, M., 2005, p. 175). Around the middle of the 19th century the Danube was proclaimed an international river and it was then when extensive works on the regulation of this river as navigable started. Not until the construction of the hydro-energy and navigable system on the Danube –HEPS "Djerdap" and the lock of a canal had been completed, was the safety of the river traffic on the whole course of the river obtained. Even today the Danube, firstly and most importantly because of economic reasons, is equally interesting and is accordingly one of the international traffic corridors, so called the "Water Corridor VII".

3. SOCIAL CHARACTERISTICS AS BASIS OF ECONOMIC DEVELOPMENT

3.1. Kostolac in the course of history

Kostolac was named after a Latin word “castellium”, i.e. “castel”, which means “a town fortress in the shape of square”. The first written sources about Kostolac as a settlement date from the 12th century. The Arab geographer Edrizi mentioned it in his travel books as “the trading town by the Danube”. In the medieval sources Kostolac is mentioned for the first time in 1380 in Hristovulja, that is, in Duke Lazar Chart to the monastery Gornjak. In the 15th century, after the final fall of the Serbian state, Kostolac was a settlement of 64 houses with their households and was paying toll to the Sandžak begs of 6,000 akches. At the beginning of the 18th century it was occupied by Austro-Hungary. It became a "Komar village" within Ramsko-Gradište district. In administrative and governmental sense it belonged to Komora or Court- Komar council in Vienna. In the 19th century, especially in the second half, there was an increase in population due to
migration and natural population growth. That way the ethnic structure became diverse. The crucial impact on its development had the opening of the coal mine in Kostolac in 1870 and the mine Klenovnik in 1883. Owing to these mines there was built a colony for the workers to live in, the management building, inns, piers, private buildings, etc. Therefore, next to the village of Kostolac a mining settlement developed, in which the miners and other laborers working in the mill or brick plant lived. In 1887 Kostolac had 212 households with 1,260 inhabitants, in 1920 there were 269 households, and in 1948 the population was 3,890.

There are some assumptions that Kostolac is one of the first Slav settlements formed in the Danube hilly region, the one that was first inhabited by the Slavs (as early as the 7th century). There is no doubt that it came into being on the ruins of the medieval town Braničevo, which was built on the ruins of Viminacium. The town of Kostolac developed from completely new settlement starting during the Second World War (1942). At that time 26 residential and 7 public buildings were erected. Kostolac was granted the status of town in February 1950 (Arsenijević, B., 1999, p. 34-44).

The development of Kostolac rested on large coal deposits, tradition in mining and suitable traffic and geographic position. This place represents a young mining-industrial center of strong population dynamics, great participation of immigrants originating from various parts of the country, of ethnic heterogeneity and young structure. Migrations of people from Kosovo to Kostolac in the 70s and 80s prevailed over those from other parts, which marked the further demographic, economic, social, cultural and special development of the town.

Table 1. The movement of the number of the inhabitants in the period from 1948 to 2002

<table>
<thead>
<tr>
<th>The year of census</th>
<th>The number of the inhabitants</th>
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<tbody>
<tr>
<td>1948</td>
<td>3890</td>
</tr>
<tr>
<td>1953</td>
<td>5294</td>
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<tr>
<td>1961</td>
<td>5977</td>
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<tr>
<td>1971</td>
<td>6372</td>
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<tr>
<td>1981</td>
<td>9860</td>
</tr>
<tr>
<td>1991</td>
<td>10411</td>
</tr>
<tr>
<td>2002</td>
<td>9313</td>
</tr>
</tbody>
</table>


In the first postwar years Kostolac records substantial growth of the population. The basis of this growth is migration of the people from different parts of the country due to mining activities. In the second stage from the mid 60s to the mid 70s, the state of mining was getting worse because of giving the advantages to oil as a source of energy. This causes a decrease of immigration and the growth of the population. The third stage begins in the 70s. At that time there is an improvement of economic conditions in the industry and energy plant thanks to reaffirmation of coal as energy fuel. It generates a higher growth of the population, so there was an evident growth of the population according to the census of 1981-1991. Demographic growth derives from a new, stronger migration wave dominated by the immigrants from Kosovo, south Serbia and north Macedonia. Of all ethnic groups the Roma people and Albanians are those who had the
fastest increase of the population in this period. According to the census of 1981, 12% of the population declared themselves Yugoslavs. Another evidence of the ethnic heterogeneity is coexistence of 25 ethnic groups in this mining community as reported by the same census. The data obtained then by the census were the following: 63, 3% Serbs, Roma people 13, 3 %, while the rest was made of other ethnic groups. According to the latest census (2002) there was a fall in the number of the inhabitants whereas the percentage of the Serbs was 74, 2%, which had changed the previous ethnic structure.

Majority of the active population, which is 45%, is engaged in mining. It is followed by 20, 2% of those employed in production and supply of electric energy, gas and water. The smallest percentage of the inhabitants, 0, 73%, is engaged in the activities related to agriculture, forestry and hunting. The percentage of the engaged in fishing is 0%.

“The creative power of transport in industry is manifested in the form of impulse or development chances that spring up in industry as the consequence of the changes within transportation system, and which are defined as long lasting, meaning that their full effect is present in a long period of time, whereas in a border line case it becomes noticeable after a period of a few decades” (Cvijić, N., 1996, p. 85).

A serious shortcoming of the main road network in the Danube-Morava corridor is a lack of service stations. They are mostly in the vicinity of big towns: Belgrade, Novi Sad and Nis. When along the road, they are set at distances more than 30 km. Also there are not attached telephone lines, the Internet and e-mail, while in some sections in Hungary, Croatia and Slovenia they exist. The telephone network belongs to the higher level of the process of modernization of road network which can be solved by the development of mobile telephony (Vemić, M., 2005, p. 180)

The Danube-Morava corridor includes all the municipalities through which the lines of this powerful geo-factor run through, or are in the vicinity and have been developed under its influence over a relatively long period of time. Kostolac is situated in gravitational zone of Požarevac, which is with 5 other municipalities classified in the Lower Danube Basin of the Danube–Morava corridor. In table 2 are presented the roads constructed in this municipality except the highways.

### Table 2. The roads constructed in the municipalities of the Lower Danube axis

<table>
<thead>
<tr>
<th>Municipalities</th>
<th>Area km²</th>
<th>Total km</th>
<th>Modern</th>
<th>Highway</th>
<th>Regional</th>
<th>Local</th>
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<tr>
<td></td>
<td></td>
<td>Total</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Požarevac</td>
<td>481</td>
<td>183</td>
<td>165</td>
<td>48</td>
<td>48</td>
<td>74</td>
</tr>
<tr>
<td>V. Gradiste</td>
<td>344</td>
<td>193</td>
<td>169</td>
<td>28</td>
<td>28</td>
<td>69</td>
</tr>
<tr>
<td>Golabac</td>
<td>368</td>
<td>139</td>
<td>109</td>
<td>44</td>
<td>44</td>
<td>27</td>
</tr>
<tr>
<td>Majdanpek</td>
<td>932</td>
<td>406</td>
<td>221</td>
<td>115</td>
<td>115</td>
<td>94</td>
</tr>
<tr>
<td>Kladovo</td>
<td>630</td>
<td>262</td>
<td>135</td>
<td>64</td>
<td>64</td>
<td>54</td>
</tr>
<tr>
<td>Negotin</td>
<td>1089</td>
<td>405</td>
<td>332</td>
<td>89</td>
<td>89</td>
<td>134</td>
</tr>
<tr>
<td>Total</td>
<td>3844</td>
<td>1588</td>
<td>1131</td>
<td>388</td>
<td>388</td>
<td>452</td>
</tr>
</tbody>
</table>


According to the data provided by Vemić Mirčeta, the municipalities of the Danube-Morava corridor occupy 35% of the total area of Serbia with 41% of the constructed road
network. Speaking about modern roads, the percentage is even higher, 46% and 51% when highways are included, which clearly shows that one half of the road network has been constructed in one third of the territory of Serbia.

As for the Lower Danube basin, 1,588 km, which makes 10,2% of the total length of the roads in Serbia (15,561 km), belong to it. The majority of the roads in the Lower Danube basis is highways with 18%, and the smallest portion make local roads with 8%. The municipality of Požarevac participates in the Lower Danube axis with 12,5% and records average results. Its largest participation is in local roads (16,3%) and the smallest is in local roads of this basin with 8,1% in the total length of the local roads. The world’s examples indicate that the best economic effects are realized by investing in economy and infrastructure in the most suitable locations, zones and corridors. By economic activation, infrastructural construction of the roads, railroads, waterways and airports, corridors become important factor in integration. Energy potential of this region is important considering the fact that Serbia uses 88% of energy resources from coal basins. The Kostolac basin (a part of the Danube basin) stands for the essential part of electro-energy system of the Republic. Kostolac has a remarkable tradition in coal excavation dating from the ancient times. On this territory, owing to coal, towns have been built and people have been coming from many regions. The riches of this region were recognized by the Romans who, on their conquering campaign west, had built their camp here which at the time of the peak of powerful Roman Empire had up to 30,000 soldiers. Roman Viminacium was connected with the East by Trajan road and at the time ranked along with Singidunum and Nias among the five largest towns in present Serbia. Archaeological findings prove that coal was excavated here from ancient times, most likely for the fires in blacksmith shops of the Roman military camp. Officially, the organized production of coal in Kostolac coal basin was started in 1870. In the shaft “Old Kostolac”, at the spot where the memorial to Kostolac miners is erected, the coal production was started, which in the time to come has largely changed the image of the whole region. The joint owner of the mine, Djordje Vaifert paid off his partner, Franjo Vstecku, in 1881 and so became the only owner of the mine. The name of Djordje Vaifert is inscribed in large letters in the history of Serbian and Kostolac mining, for he had made great investments in the research of mineral resources of Serbia. As early as 1883 another mine was opened-the shaft “Klenovnik”. In both of them the work conditions were similar: the corridors were built in coal, by cutting the side walls, mining the front and manual loading of coal in carts, while the coal was driven away by horse-drawn wagons. To make sure that the excavated coal was in large pieces, the owner didn’t pay for the small ones, and the miners had to provide the explosive themselves.

The coal from Kostolac mines was shipped to market by water transport-on the Danube and by air cable cars from Klenovnik to Požarevac. The shaft “Old Kostolac” ceased to operate in 1966, and the shaft “Klenovnik” in 1959. The shortest time of production had the shaft “Čirikovac”. It was opened in 1955, and closed down after two years. The future of Kostolac coal basins was not in shaft exploitation. With the development of science and technology in the world, the possibilities for surface exploitation of mineral wealth were created. The first surface excavation site in the country as well as in this area was opened by Germans at the time of the occupation, during the Second World War, in 1943. The first power plant on coal was put in operation in November 1948. It was named “Small Kostolac” and had the power of eight megawatts, which at the time was impressive. Parallel to its construction was the construction of power
plant “Big Kostolac”, which had four turbo-generators with the total power of 44 megawatts. The first turbo-generator of this plant was put in operation as early as 1949.

The surface excavation site “Kostolac” was the first of its kind in the country, and was closed down in 1980 (by that time 23.5 million tons of coal had been produced). Later on within the construction works on the Excavation site, the Field “Klenovnik” was opened above the previous shaft “Klenovnik”. In 1968 the first Block of the power plant “Kostolac A” with the power of 100 megawatts, which at the time was the biggest thermo-energy block in Serbia, was put in operation. By the reconstructed excavation site “Čirikovac”, the surface excavation “Čirikovac” was started in 1980, when the first freight trains loaded with coal set off for power plants “Kostolac A”. The opening of a new surface excavation site “Drmno” in 1987 led to dramatic increase of coal production capacities in Kostolac basins. A year later the first block of power plant “Kostolac B” with the power of 348.5 megawatts was integrated in the electro-energy system of Serbia. Its other Block, which was of the same power, started operating after three years. In 2009, the new, fifth BTO system on the excavation site “Drmno”, which will additionally enlarge the capacity of coal production, was put in operation. Even after decades’ long high surface exploitation in the basin of Kostolac, there are still reserves which will provide potential production of 9 to 12 million tons of lignite (Arsenijević, B., 1999, 121-129). The company “Thermo-power plant and excavation sites Kostolac”, limited liability company (d.o.o.) is the energy company which is a part of Electric industry system, which comprises another ten production and distribution companies. It has been in the present form since January 1st 2006, when the merging of public enterprises Surface excavation sites “Kostolac” and Thermo-power plant “Kostolac” took place in the process of reorganization of the Electric industry of Serbia. Today within this Economic Company, there are the following production capacities:

- The surface excavation site “Čirikovac”
- The surface excavation site “Drmno”
- The power plant “Kostolac A”
- The power plant “Kostolac B”

The surface excavation site “Drmno” has been in exploitation since 1987 and stands for the basic capacity for the coal production in the Kostolac coal basin. The projected production capacity of this excavation site is 6.5 million tons of coal per year in the first phase, and 9 million tons of coal per year in the second phase of development. On this surface excavation site five BTO (dredging machines-conveyor belt-scrapes) systems for the production of scrapes and on BTD (dredging machine-conveyor belt-dump) system for coal production are involved. Within power plant “Kostolac B”, there are two production blocks: block A1 100MW, in which the production was started in 1967 and block A2 210 MW, which has been operating since 1980. Within the plant “Kostolac B”, there are also two blocks: block B1 348.5 MW in which the production started in 1988, and block B2 348, 6 MW, which was started in 1991.

Apart from the excavation of coal, the production of thermo-electric power by coal is the dominant activity of “TE-KO Kostolac”, with the 14% participation in the total production of the Electro-industry of Serbia. Thermo energy which is released in the process of production supplies the public enterprise “Toplifikacija” in Požarevac and is used for 24 hours heating of Požarevac and the nearby villages during winter months. Scrapes is the main side product of the excavation, i.e. the surface layer of soil that covers
coal and which must be removed to reach the coal. However it is not considered waste, for it can be used for revitalizing the soil.

Economic company “TE-KO” Kostolac is very concerned about the education and further training of their staff and for that purposes the formation of a special division of human resources has been started, who will organize and manage this activity applying the highest existing standards in the modern business world. The English language courses of different levels are organized for management team of the Company. In the division for the integrated management system (IMS) trainings are being permanently organized for the executives, as well as for internal and external appraisal within quality management system (QMS) in accordance with standard YUS ISO 9000.

In the Economic Company the following environmental issues have been prevented:

- Air pollution- emission of the solid particles and smoke gases
- Aero pollution-dispersion of ashes from landfills
- Water pollution including ground and surface water

The efforts that are being made for the preservation of environment are of great importance for the successful performance of the Company and are equal to those made for permanent improvement of the quality of production process and supply of electric energy and coal along with the reduction of the costs of the production. Every year in the Company, that is in the power plants, over 7 million tons of coal is burnt out and the product of this is more than 1, 6 million tons of ashes and cinder, which are disposed on the open depositing places, total area of 250 hectares. In order to handle these issues adequately, efficiently, and on time, a plan for the protection and improvement of the environment has been drawn containing among other things: the change of collecting, transportation and disposal of ashes, reconstruction of the electro-filters in the power plant “Kostolac B”, desulphurization of smoke gases; emission and imission monitoring; waste managing.
Some of the projects have been successfully realized. Within the project of the reconstruction of the electro-filters in the power plant “Kostolac A” the emission of solid particles into the atmosphere has been reduced, actually has been reduced to less than 50 milligrams per cubic meter, just as much as it is regulated by the Law about environment protection of the Republic of Serbia and low regulation of the European Union. In the Company, in accordance with legal regulations, all legally defined permanent measurements and monitoring of the conditions of the environment (air, water, soil, noise, wastes) are being carried out. Instruments for permanent measurement of the smoke gases and particles emission have been installed in the power plants (Corporate catalog “TE-KO” Kostolac).

Apart from evident energy potential, which defines this region and gives it the status of special purposes in a regional sense, within the Danube region there is a mutual attitude and interest that the Danube provides the possibilities for cooperation on today’s essential subjects: attract investments for the development of small and medium enterprises and financial market; the development of transport and infrastructure—especially river transport as a support to regional cooperation, and ports and marines meant for strengthening the regional connections; tourism and culture—especially, navigation and cycling along the Danube, mutual cultural treasure; environment protection and water managing—especially enhancement of the protection of the waters of the Danube, and science and business cooperation. A large regional potential on this territory is archaeological site “Viminacium” (Space plan of the district of special purposes of Kostolac coal basin). Kostolac abounds in various natural and cultural attractions. Tourism is yet another possibility which will help the economic development of this place and its surroundings.

The waterway of the Danube, as part of the international traffic Corridor VII represents an important transit and touristic direction (Bjeljac, Z., Popović, I., 2004, p. 3). “On the river bank and the waterfront of the Danube there are numerous natural attractions, cultural—historic and other anthropology values and facilities which offer numerous and various activities to visitors. The river itself provides possibilities for the development on navigational tourism and water sports (Strategy 1999), and on the waterfront there are conditions for the development of sport and recreation, picnic-weekend, rural, eco, cultural, manifestation and spa tourism. The navigation club “Dunavac” considerably contributes to the development of tourism in Kostolac. There are sections for motor-navigation, navigation recreation, water skiing, sport divers, rowers, section for self-construction and ship modeling.

The importance of the Danube as the water reservoir derives from the generally accepted calculation of the world’s experts that in the coming millennium water will become of short supply. According to that fact there is a need for the application of the principles of sustainable use of this resource. Therefore, the exploitation of the Danube for the sake of economic development must be such as to provide its ecological protection thus enabling the generations to come in the following decades and centuries to take advantages of this natural resources at least as much as these today’s are (Stojic-Karanovic, E., 2002, p. 227).

Sport fishing society “Dunavac” Kostolac came into being in 1948. For over fifty years it has been active here and also on all waters in Serbia. SFS “Dunavac” is reputable for their good organization skills in important contents. Within the manifestation the Days of Miners it has organized a traditional cup for 17 years. It was awarded the plaquette by
Kostolac is closely connected with Viminacium, an archaeological site, once a Roman town and a fortress and the capital of Upper Mezia province. The stories of the gone splendor and fall of this Roman town and military camp Viminicium have captured the attention of not only national, but the world’s public which impatiently are awaiting Viminicium to take the position on the world cultural-historic scene which justly belongs to it. The area of former Roman town and military camp Viminicium (more than 450 hectares of the wider and 220 hectares of the closer town area) lies today under cultivated soil, while objects and pieces of objects belonging to the Roman period are scattered in the fields furrows. Over the last three decades of the 20th century there have been three explorations of Viminicium town of the dead or necropolis and so far more than 13,500 graves have been discovered. An interdisciplinary team of eminent experts in different teams work on research of this Roman town and military camp. The project Viminicium apart from archaeologists, includes mathematicians, electro-engineers, geo-physicists, geologists, petrologists, and researchers in the field of remote detection, 3D modeling and recognition of the form, but also artificial intelligence. Their universal wish is to make the squares and temples, theatres and hippodromes, baths, streets and town quarters emerge from the plowed fields, buried there for centuries, and become part of the world’s and our culture legacy, but also the landmark of the Danube areal.

The premises of VIMINACIVM-DOMVS SCIENTIARVM are situated on a remarkably attractive location close to the Danube, which provides immediate and accessible flow of tourists by water transport. The premises themselves should through coming of the visitors, organizing of congresses and thematic gatherings provide income which will with other touristic attractions create funds needed for financing further research works and the development of archaeological park. DOMVS SCIENTIARVM is the pinnacle in specific and unique touristic offer with authentic Roman ambient. In the future the completion of the construction of the premises will create new jobs for the staff of different qualifications from different fields of work that will on the one hand give support to professional team and on the other hand make a touristic service which will through different services and jobs provide further funds for the work in the archaeological park (www.viminacium.org.rs). In the spring of 2003 the archaeologists came up against a sensational discovery here on the territory of Kostolac i.e. the surface excavation site “Drmno”: a 14 km long aqueduct, the longest and the best preserved one in the world. In order to save the aqueduct, the management of the excavation site “Kostolac” together with the Institute SANU and the Republic Institute for Protection of Monuments reached an agreement: the aqueduct will be displaced in pieces, and the work on surface excavation site will continue. The project for cutting and restoration has been made. In this work, apart from archaeologists, the workers and machinery of the Excavation Site “Kostolac” are employed. In that way the attitude of the management of the Excavation Site has been expressed: natural and human wealth has met at one place, and neither of them can be endangered.

A special attraction within the archaeological park Viminacium is a visit to prehistoric site where a complete skeleton of a mammoth was discovered. This skeleton was found 270 m away east of the Tsar Mausoleum. The mammoth belongs to prehistoric times, the Miocene 5,000,000 years ago. It was found in the water flow former estuary of
the river Morava, which was formed when the Pannonia Sea was receding. The mammoth belongs to exceptionally rare species and is the oldest one in the world. So far about twenty mammoths have been found in the world, mostly in the 19th century, but none of them was so well preserved on the spot. For that reason, that mammoth is of special significance and importance. In the time from which the mammoth came, the climate in this area was warm (a mild sub-tropical) with lots of warm-feeling vegetation, which would disappear due to the flurry of cold climatic cycles during the ice age Pleistocene. The mammoth and the space around it will represent the location, in which it will be possible to study the history of the Earth in a unique way through preserved layers (strata). The founding place of the mammoth at Viminacium, together with geology of the Surface Excavation Site, will surely be enlisted in the treasure of the objects for the protection of geological heritage, not only in Serbia, but in the world as well.

The world’s renowned archaeological site “Viminicium” is situated in the exploitation field of the Surface excavation site “Drmno” (Spatial plan of the region of special purposes of the Kostolac coal basin) so that its intensive development over the recent years has been connected with a significant technical and financial assistance of the Company, as well as the coordination of mutual activities in order to preserve cultural legacy and provide further unobstructed production of coal and electric energy.

CONCLUSIONS

Apart from evident energy potential, which characterizes this district and gives it a status of special purposes in a regional sense within the Danube region there is a mutual attitude and interest that the Danube also offers opportunities for cooperation on today crucial subjects: The development of transport and infrastructure – especially river transport as a support to regional cooperation, and ports and marinas aiming strengthening
of the regional connections; tourism and culture—especially, navigation and cycling along the Danube, a mutual cultural treasure; environment protection and water managing—especially the enhancement of the waters of the Danube, and the cooperation of science and business. An important regional potential on this area is the archaeological site “Viminicium”.

The greatest possibilities for sustainable use of natural, but also cultural resources, whether they derive from geographic position or rich treasure of still unspoiled nature and cultural legacy, are offered for the development of tourism, as a complex industry activity. The development of tourism would boost the development of all these economic activities with which it is connected, such as agriculture, food industry, transport, etc. Transport itself on the one hand, is in a way a “user” of development possibilities, and on the other hand the very planning of the development of certain communication lines represents a new potential for the economy development. Considering that on this territory it is about the potentials of national and regional importance (energy basin, varied importance of the Danube corridor, the archaeological site, fertile soil in the valley of the Mlava, researched oil and gas fields, the immediate nearness of two European corridors VII and X), the further development means mutual acting on inter-municipality, inter-cities, trans-border and international level. The archaeological site “Viminicium” is because of its characteristics listed in the preliminary list of the Republic of Serbia for the world culture and nature legacy (UNESCO). On the other hand, mining—energy—industry system Kostolac represents one of the most important systems of the energy production in the Republic of Serbia. Naturally, science must be involved in the development of economy of this place, which will through educational institutions, but also through direct work on the projects and development, create a safe route to the future. Also science has to be involved in the development of infrastructure, communal construction and economy development and naturally, cultural affirmation of the ideas. Kostolac was and is a multi-developing town, but not a mining colony, as it once began and should stay like one.

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