

## **Project Concept Note**

### **COAL MINE ZIVOJNO**



***Prepared by: Development and Investments Department***

***Skopje, 2019***

## INTRODUCTION

<b>Project type:</b>	Coal Deposit
<b>Geological reserves:</b>	101.684.407 t
<b>Exploitation reserves:</b>	20.500.000 t – underground exploitation 32.000.000 t – open pit exploitation



Deposit "Zivojno" is the third main coal deposit in Pelagonia region and it is located approximately 35km southeast of town Bitola to the border between Republic of North Macedonia and Greece or 20 km from mine Suvodol and it is extension of mine Brod-Gneotino (cca 4 km from Brod-Gneotino). It is expanded to the border line with Republic of Greece on south, village Zivojno on east, village Germian on west, to

the river Crna on north and spreads over an area of cca 25,0 km<sup>2</sup>.

The deposit is represented by hydro geological complex with specific characteristics of the terrain. The thickness of the main coal seam has continuous spreading throughout the entire deposit and varies between 0,4÷8 meters. The depth at which is situated is variable and starts from 33 meters to 195 meters (depending on the relief on the surface above the coal seam).

From the previous systematic investigations carried out in the period of the 1966 up to 1984, there is "Coal reserves elaborate" in coal deposit Zivojno, elaborated by Geological Institute – Skopje. In October 2012 the detailed geological investigations have finished, which resulted in final and accurate parameters regarding quality and quantity of the coal seams, geotechnical, geological and hydro-geological data from the surrounding rock masses. All this data is compiled within the following technical documentation:

- Elaborate for classification and re-categorization of the coal reserves
- Elaborate from the engineering-geological and hydro-geological investigations
- Elaborate from geotechnical research and investigations
- Elaborate for examination of self-ignition and gas contents of the deposit

## RESERVES AND QUALITY

This documentation confirms the coal reserves with the following quality and quantity parameters:

▪ Overall geological reserves	101.684.407 tons
▪ Humidity	46,57 %
▪ Ash	19,14 %
▪ Total sulfur	0,83 %
▪ Coke	32,80 %
▪ Combustible substances	33,83 %

- LHV 7.452 kJ/kg
- Geological reserves in the Main coal seam 74.057.850 tons

Geological reserves of coal (calculation by block method, with LHV>4170 kJ/kg)

Reserves	Main coal seam [t]	Overall reserves [t]
<b>Category A</b>	16.605.843,15	26.508.036,90
<b>Category B</b>	29.464.515,48	38.738.004,66
<b>Category C<sub>1</sub></b>	27.987.491,89	36.438.366,01
<b>TOTAL:</b>	<b>74.057.850,52</b>	<b>101.684.407,57</b>

**Picture 1: Core samples from the geological investigations at Zivojno coal deposit**



### Current status

The detailed investigations from geological, hydro-geological engineering-geological and geotechnical aspects have finished, resulting with final and revised Analyses from the detailed investigative activities.

Technical-economic Elaborate for Zivojno with preliminary data for the possibilities of exploitation and coal utilization from Zivojno deposit as an energy resource is prepared.

There are prepared Study for justification of the exploitation concession of raw material – coal at the site “Zivojno” with open pit technology and Study for justification of the exploitation concession of raw material – coal at the site “Zivojno” with underground technology.

Main mining design for opening, development and exploitation of coal in the Zivojno deposit with underground technology is prepared and revised.

At the moment, there is an ongoing procedure for elaboration of the Main Mining Design for coal exploitation from Zivojno deposit by means open pit technology.

## INVESTMENT COSTS

The total planned amount for opening of Zivojno mine, in accordance with the Technical-economic Elaborate for Zivojno is 103.550.000,00 Euro. From the full amount, it is planned 15% of the value to be from JSC ESM own funds, amounting 15.532.500,00 Euro, and the rest will be from credit.

**In accordance with the above, the value of the Credit for realization of this project is estimated at around 88.017.500,00 Euro.**

Total investment		
1.	Preparation of underground pit mine facilities	10.170.000
2.	Electrical & Mechanical equipment	83.000.000
3.	Civil works	1.500.000
4.	Operating costs	8.380.000
5.	Contingency costs	500.000
<b>Вкупно</b>		<b>103.550.000 €</b>

## ESTIMATION ON THE BENEFITS OF THE PROJECT

According to the Technical-economic elaborate Zivojno for mine exploitation elaborated in 2013 from Premogovnik Velenje Slovenia, there are valid possibilities for excavation of coal with underground exploitation, and with excavation of up to 1 million tons of coal annually.

The overall estimated geological coal reserves in deposit Zivojno, possibility for their exploitation and proximity with TPP Bitola (cca 20km), justifies the efforts for its usage for longer time period

In addition to the extension of the operation life of the thermal power plants Bitola, another positive effect is prevention of greater imports of electricity.