



ЕЛЕКТРОПРИВРЕДА СРБИЈЕ

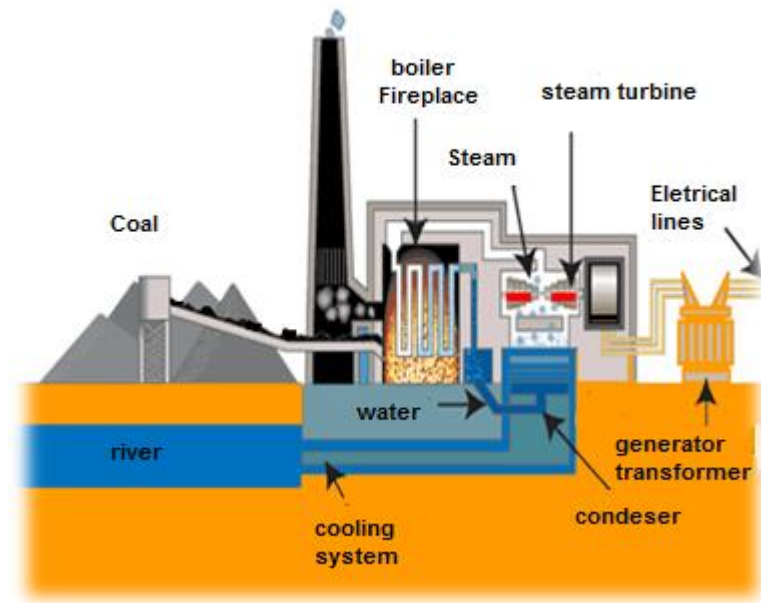
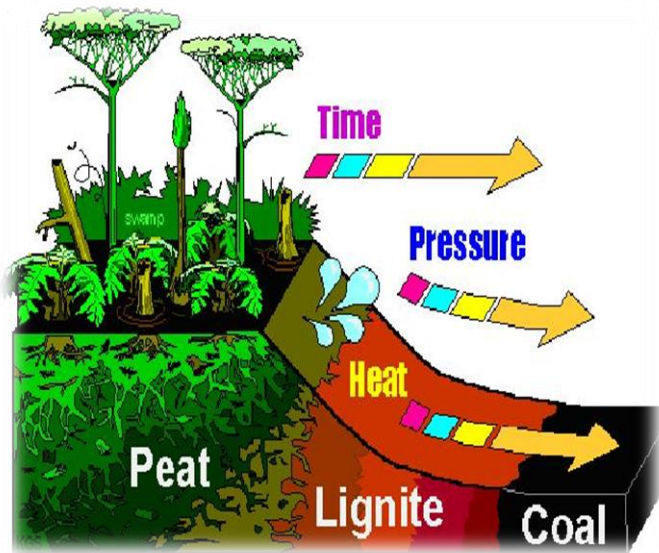


Future Development of Coal Production in PE “Electric Power Industry of Serbia” (EPS)

Mr. Slobodan Mitrovic, Executive Director of Coal Production, EPS

Coal

- Black or blackish-brown sedimentary rock of organic origin which is combustible, so it is used as a fossil fuel that is excavated applying mining methods.
- By far the most important energy resource of Serbia, accounting for around 85% in the structure of total primary energy reserves.



PE EPS - Production Capacities

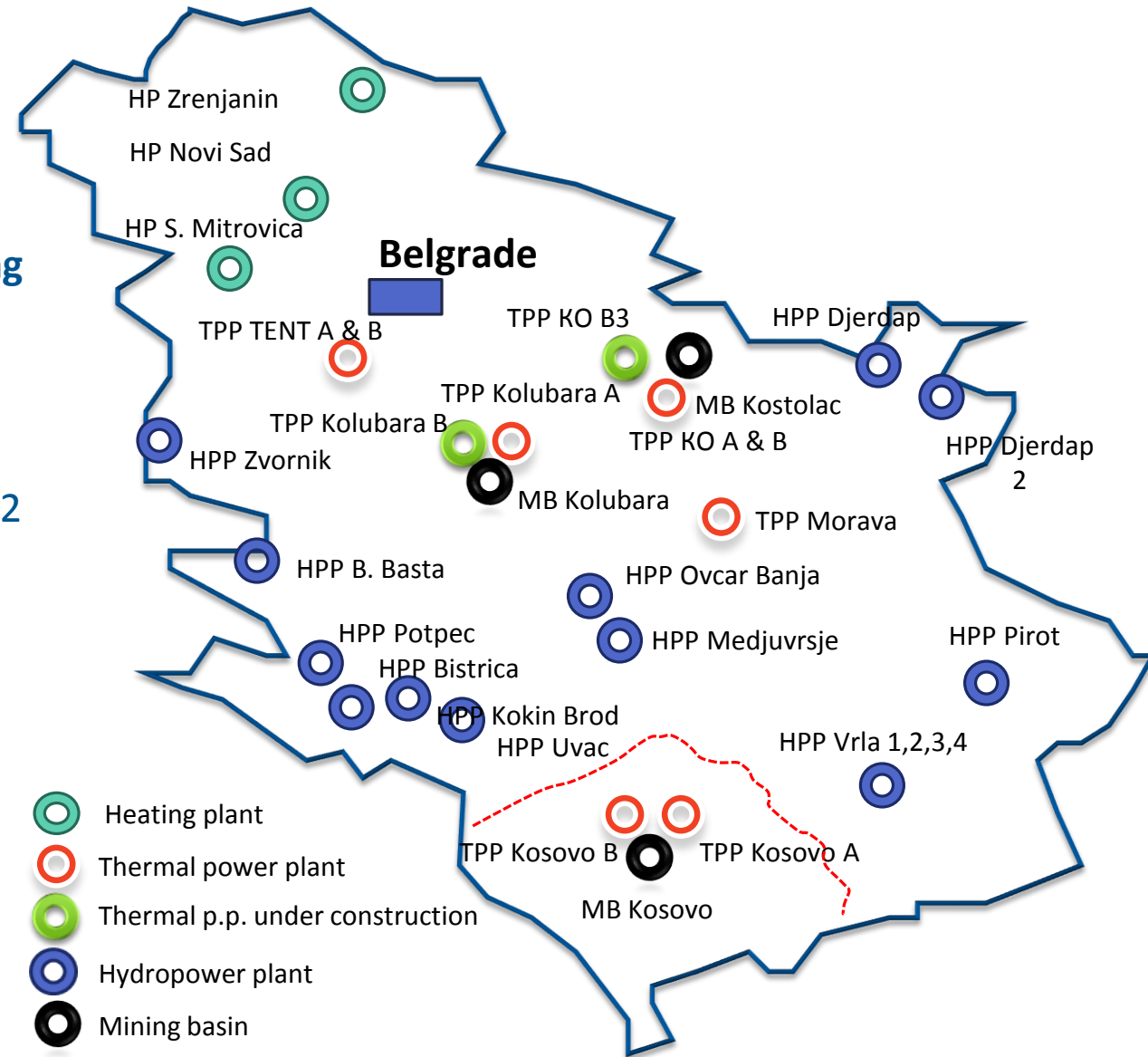
The total installed power generation capacity (excluding Kosovo):

The total installed capacity 7 326 MW

- 22 thermal power plant units - 4 390 MW
- 49 hydro generating units - 2 936 MW (1 RHPP with 2 aggregates and 2 pumps)

Total power generation per year 36-37 TWh

Total coal production per year 38-40 million tonnes



Coal Production in PE EPS

- MB Kolubara – 4 active open-pit mines and 2 open-pit mines in preparation for opening
- MB Kostolac – 1 active open-pit mine

- Total coal production per year is about **40 000 000 t**
- Total overburden production per year is about **150 000 000 m³**

- Water drainage is performed in pumping plants
- About **52 000 000 m³** are being pumped out per year (**1.3 m³/t**)



Coal Production in Europe and Ranking of the Republic of Serbia

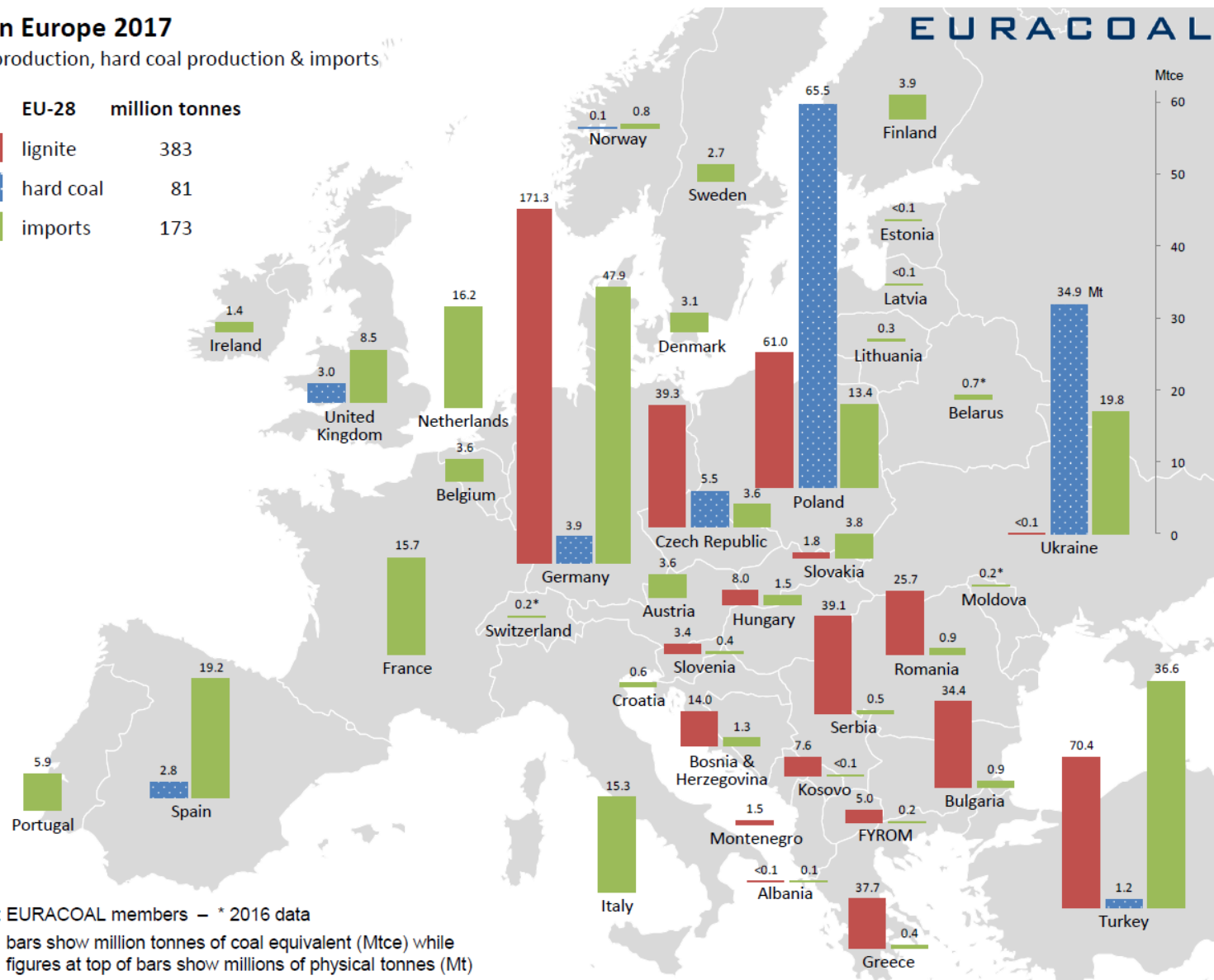
Lignite production in Europe:

1. Germany
2. Turkey
3. Poland
4. Czech Republic
5. Serbia
6.
7.
8.

Coal in Europe 2017

lignite production, hard coal production & imports

EU-28	million tonnes
lignite	383
hard coal	81
imports	173



Reserves and Coal Quality in the Republic of Serbia

Verified lignite reserves in the Republic of Serbia amount to approximately 16 billion tonnes, of which **2.8 billion tonnes** are found in Kolubara and Kostolac mining basins.

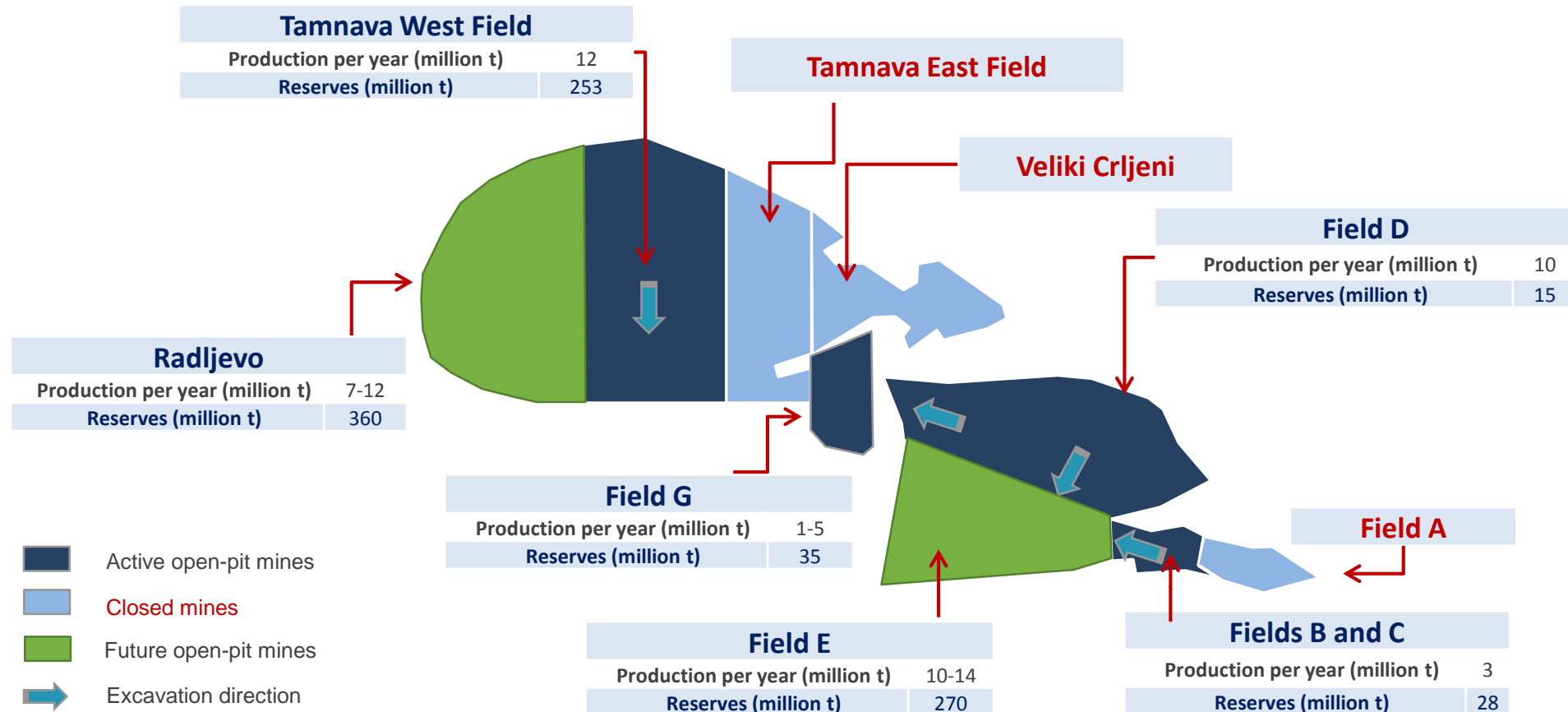
- **Average calorific value of lignite produced in Kolubara is 7,200 kJ/kg**
- **Average calorific value of lignite produced in Kostolac is 8,000 kJ/kg**



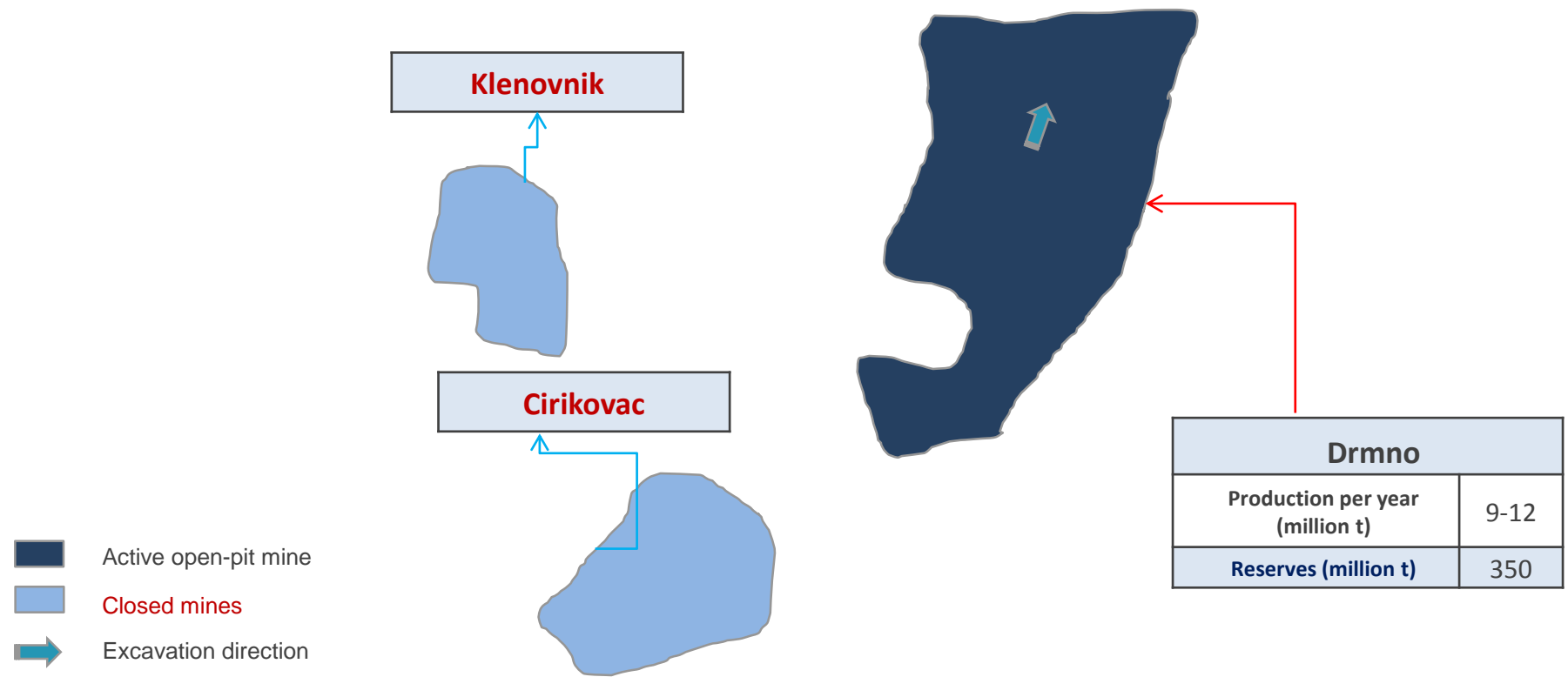
According to the Balance of geological reserves and resources of mineral raw materials of the Republic of Serbia:

- More than 76% of the total coal reserves of Serbia are located in the Kosovo and Metohija mining basin.
- 14% of coal reserves are in Kolubara mining basin.
- 3.3% of coal reserves are in Kostolac mining basin.
- Only 2.7% of total coal reserves are found in Kovin and Sjenica mining basins.
- The remaining reserves belong to underground mines.

Coal Production Capacities of MB Kolubara



Coal Production Capacities of MB Kostolac



Strategy of Coal Production Development

Mission

“Creating conditions for regular, safe and reliable electricity supply in a competitive and profitable manner, while constantly improving environmental standards and corporate social responsibility”

Coal production development

- In the past it was primarily based on expanding production capacities.
- The main focus of future development is on quality management, energy efficiency, productivity improvement and compliance with European environmental standards and norms.

Development goals

- **Stable production** – new open-pit mines (systems)
- **Quality management** – homogeneous coal quality
- **Efficiency improvement** – projects
- **Ecology**
- **Improving cost-effectiveness of mining production** – process automation and introduction of production management systems
- **Enhancing corporate social responsibility**



Advances in Mining Technology



The Vrdnik brown coal mine – the oldest coal mine in Serbia was opened in 1804. In the Stari Kostolac (Old Kostolac) mine pit coal production officially began in 1873.



The first open-pit mine in Serbia was opened by Germans during the occupation (1942) in Kostolac.



Today, the technology of mass excavation is applied in EPS open-pit mines, using high-capacity continuous mining equipment.

The future is in the automatization of operational processes.



Development of Production Planning Processes

$$2 + 2 \neq 5 = 4$$



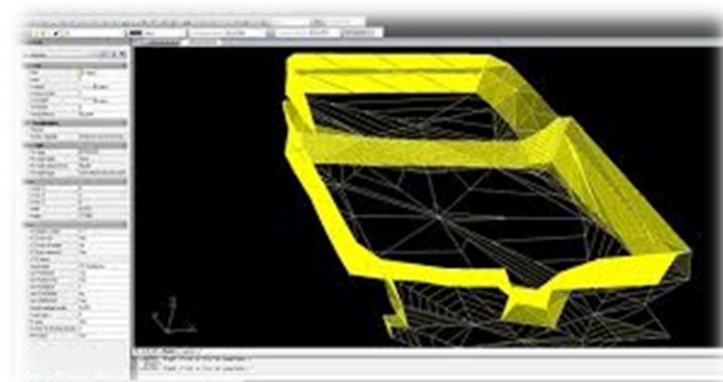
- Initially, planning was aimed at meeting short-term demands.
- A considerable increase in production has led to a need for long-term planning.



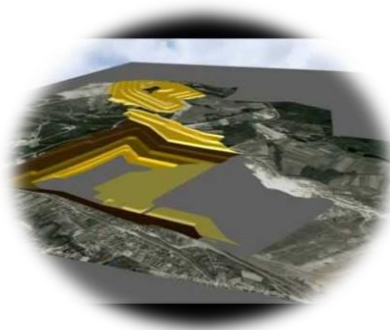
Today there are:

- Strategic level of planning:
«long-term development program»
«three-year business plan»
- Operational level of planning:
«annual plan»
«monthly plan»

- In the upcoming period, planning processes will be increasingly affected by the need for achieving targeted coal quality.



Development of Production Management Processes

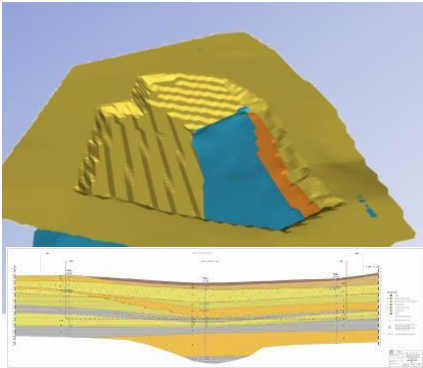


- Direct control – a basic level with the longest tradition
- Introduction of control and monitoring systems in production processes
- Introduction of modern information systems for integrated planning, monitoring and management of production processes

- Development of integrated systems for automatic management and monitoring of processes



Implementation of Coal Quality Management System

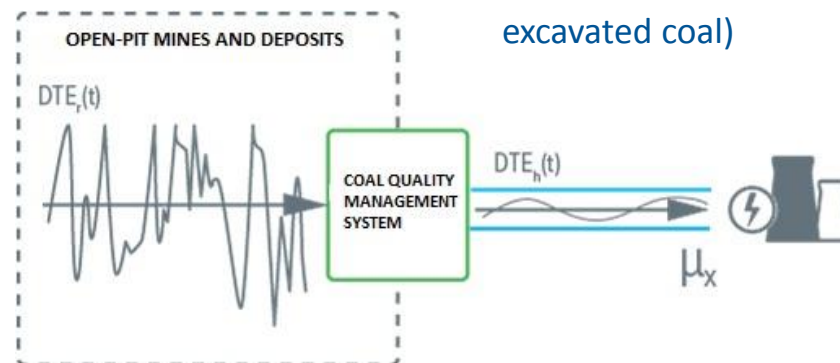


- Creation of geological models of coal deposits
- Creation of technological models of exploitation



- Operational production planning
- Operational production management

- Coal quality management system (homogenization sites and equipment for continuous monitoring of the quality of excavated coal)

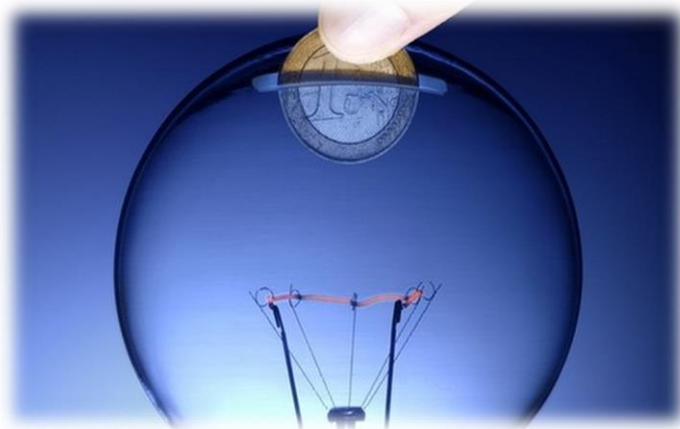


- **Better utilization of reserves**
- **Stable operation of TPPs**
- **Improved financial results**



Economic Importance of Mining

EPS has always achieved stable and reliable coal production, thus enabling the continual realization of the country's energy balance.



- The current production of EPS open-pit mines is approximately **40 million tonnes per year** (more than **70% of total energy generated** in Serbia).
- EPS annually produces **from 24 to 26 TWh** of energy from lignite.

- Lignite, as a basic fuel for electricity production, has no alternative in Serbia.



Environmental Improvement in Coal Production



- Land reclamation
- Desulphurization
- Use of ash in construction industry
- Modernization of coal production and processing plants
- Dust suppression systems

- Soil degradation
- Combustion by-products
- Ash landfills
- Noise and vibrations
- Dust ...



Conclusion





THANK YOU FOR YOUR ATTENTION!

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