

Energy Tales

Volume 2: Meeting in Ostrava

October 2022

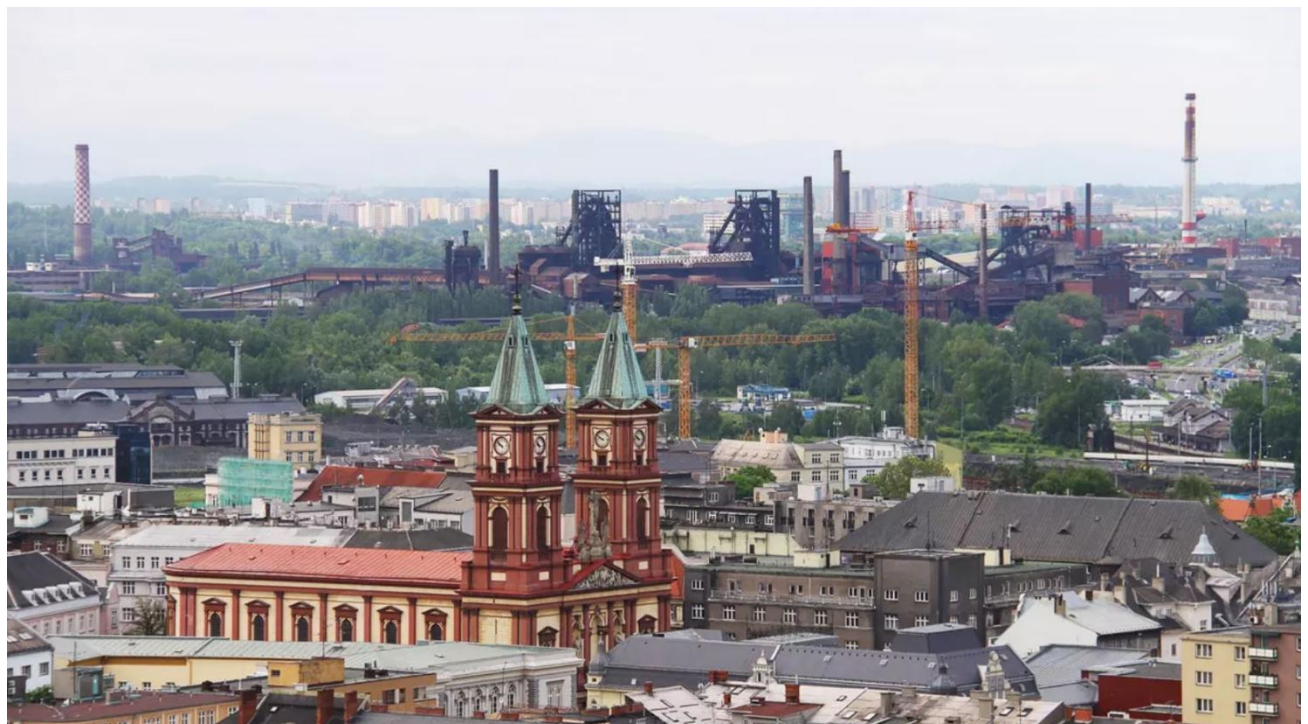
Heavy Industry x Environment

Content:

- 1) Landscape changes caused by industry in Ostrava
- 2) Black coal mining industry in Ostrava and Karvina area
- 3) History of metallurgical and engineering plants in Ostrava
- 4) Thermal Power Plant Třebovice
- 5) Environment protection

1) Once upon a time there were many little villages situated in a valley between the Beskydy and Jeseníky Mountains, near the border with Poland and Slovakia. Until 1763 people lived happily on their farms, at the intersection of important paths from the South to the North and from the East to the West of Europe.

Then black coal was rediscovered in 1763 and Ostrava landscape changed. Many black coal mines, ironworks, steelworks, coke ovens, slag and coal heaps grew in the city of Ostrava and its surroundings. You can observe them from the **Ostrava Town Hall lookout tower** which participants visited on Monday afternoon.





2) Black coal seams appear at the surface in this area which is unique in Europe and it enabled even the Paleolithic people to find out that the black coal gives more warm than wood. The archeologist confirmed this theory when they found a fireplace with mammoth bones and black coal cinders under the Landek Hill near Ostrava. It proved that 23 000 years ago people were finding and using black coal.

It took less than 100 years to confirm that there were rich supplies of high quality black coal and Mr. Rotchild bought the first real black coal mine under the Landek Hill. He named it Anselm after his son. Nowadays there is a mine museum with exhibition placed in a former coal seam 5 metres under the surface. Participants visited **Mine Museum Landek** on Thursday afternoon and learnt a lot about the historic and modern ways of coal mining.



Many mines were opened from 1840 to 1989 in Ostrava-Karvina area. There are two coal formations in this area: Ostrava (with total thickness 2,880 m) and Karvina (1,200 m). The average thickness of the seams of the Ostrava Formation is 73 cm, with the thickest seam that reaches a maximum thickness of up to 6 m. The Karvina Formation has an average layer thickness of 180 cm, the thickest seam reaches a maximum thickness of up to 15 m.



Soon the landscape of the area was changed as the rocks which were excavated together with the black coal were thrown away on heaps, some of them were more than 100 high. The highest heap is called Ema, 312 metres, and is situated near the Ostrava ZOO with a magnificent view of Ostrava.

As the mines were getting deeper, even 1350 metres deep, it became very expensive and difficult to excavate coal. In 1989 it was decided to terminate all the mines in Ostrava-Karvina area. In Ostrava the last coal was excavated on 30 June 1994. The last coal mine in the Karvina region will be closed soon. When the coal excavation stopped, heaps were recultivated, trees and many plants are growing there now. Near our school is a **heap called Hrabůvka**, where you can find a very clean lake. We know that as the participants measured the water quality on Tuesday afternoon and found out that its water was as clean as in a swimming pool.



One of the largest mine in former city of Karvina was called Gabriela. Over 2000 tons of high quality black coal were excavated every day after WWI. The extensive coal extraction was increased during the WWII and went on until 1960s.

The thick net of corridors and excavated mining seams under the former city of Karvina started to collapse. They were up to 10 metres high so the impact on the landscape and buildings was massive and the ground dropped unevenly. The first visible cracks on the buildings appeared in 1930s. The situation got worse in 1960s when the land collapsed visibly, wide cracks in the roads and pavements appeared, hills sunk approximately 40 metres and all buildings (houses, shops, schools, churches, a hospital, a brewery etc.) started to decline and break down. The lowered ground was filled with water and many ponds appeared.



of mine tunnels under the site. Now the church is leaning to the south – but it is still standing. It leans 6,8° which is almost as much as the world-famous Leaning Tower of Pisa in Italy. At the present time the church stands lower than the surrounding area. In spite of those facts, the church was not damaged significantly and it was possible to reconstruct it in 1994 and save it. It is the only remaining building of the former city of Karvina. People had to leave this place and built a new city. They named it Karvina again. Participants visited the declining church on Tuesday afternoon and learnt facts about the devastating impact of coal excavation on the environment.





3) The high quality black coal from Ostrava and Karvina area is suitable for heavy industry. To melt iron in the ore you need to reach temperature over 1000°C and steel melts from 1623°C to 1673°C . This temperature cannot be reached by using regular brown or black coal. Only the high quality black coal called Antracit can be transformed into coke which can give heat over 1800°C . And because of that many coke ovens which were extremely polluting air were built in Ostrava. First ironworks and steelworks were built in Ostrava-Vitkovice in 1828. The whole area became a huge factory. Some parts are still producing iron, steel, steel sheets, ship shafts, etc. Some parts became preserved area known as Lower Vitkovice where you can find technical museums, an agricultural museum, a lookout tower, a huge gas tank converted into a concert hall. Participants observed the unique architecture of this industrial place and visited interactive **Science Technical Museum U6** situated in an old factory building U6 on Tuesday. They learnt for example about production of steel and iron, tried simple experiments with electricity.



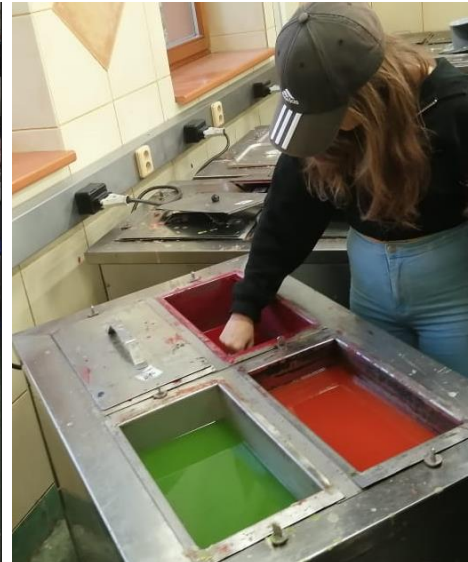
4) Black coal was used as fuel in power plants. There used to be a lot of pollution caused by sulfur dioxide and dust from burning the coal. Nowadays new technology enables us to capture dust and desulfurize vapour effectively from fumes.

Power and Thermal Power Plant Třebovice uses black coal as fuel. There are huge mills which grind black coal into powder which is burnt more effectively than normal coal in 8 boilers. It heats water which becomes vapour. This vapour is heated again and it can reach up to 400°C. The superheated vapour drives 3 turbo generators and electricity is produced. This power station uses closed system where the super heated vapour is used repeatedly. Some of the hot water is also used to heat households. Denitrification and desulphurisation of all units is currently underway at the plant to meet the strict emission limits for TZL, Nox and So₂.

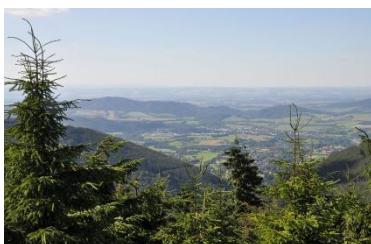
Participants visited Ostrava-Třebovice Power Station on Thursday morning.



Before electric energy, people used different sources of light. A family **Candle Factory UNIPAR** produces hand made candles in Rožnov near Ostrava. The technology has also changed and they are proud that they use the newest procedures in order to lower waste and avoid pollution of the beautiful Beskydy countryside. The most important is to desulfurize and recycle raw materials, e.g. wax. This factory is unique due to the design and manufacture of candles from superfine materials. They make exceptional hand-created candles with precise specifications according to customers needs in Czechia and abroad. Participant decorated their candles during the excursion on Wednesday morning.



5) Ostrava is surrounded with small hills covered with trees. Many of them are recultivated black coal and slag heaps. A little bit farther there are the Beskydy Mountains which participants visited on Wednesday afternoon. They were looking for damages caused by the bark beetle and comparing composition of the forest with their countries. They also compared the architecture of traditional wooden houses in **Pustevny**. On the way home participants collected water samples from Ostravice River and Ondřejnice River.



Ostrava ZOO informs visitors about wildlife and takes part in international programs which help to save endangered species. Participants learnt about these activities during a lecture. The lecturer described conditions which pets and wild animals need and how they react when they are stressed.



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