

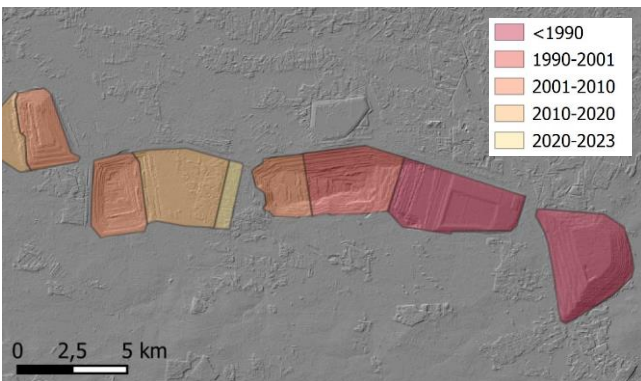
1990-06-12, Landsat 5



2010-08-22, Landsat 5



2023-06-01, Sentinel-2



Change of the mine area

The Bełchatów lignite mine, located in central Poland, covers an area of more than 12,500 hectares. This open-pit mine is one of the largest in Europe and has been operational since the mid-1970s.

The mine's significance lies in its huge reserves of lignite, a low-grade coal used extensively for electricity generation. With an estimated deposit exceeding two billion tons, the Bełchatów mine supplies the adjacent Bełchatów Power Plant with more than 40 million tonnes lignite per year. With its capacity of more than 5.3 GW the power plant is one of Europe's largest thermal power stations. The mine and the power plant together account for a substantial portion of Poland's electricity production.

Mining at Bełchatów involves the use of colossal excavators and transportation machinery. Massive trucks carrying hundreds of tons of lignite cross the site, facilitating the extraction process. As the satellite maps show, the mine has been shifted westwards, following the coal deposits.

The Bełchatów lignite mine also faces huge environmental challenges due to the extraction of fossil fuels and greenhouse gas emissions. With emissions of 30 million tons of CO<sub>2</sub> in 2020, the adjacent power plant was the biggest single emitter of this greenhouse gas in Europe. Despite its crucial role in the energy sector, Poland is increasingly focusing on sustainable energy sources to reduce its carbon footprint and meet international environmental commitments.

#### Exercises

- Look at the satellite maps and try to identify the land use and land cover classes in the region.
- Explain the development of the extent of the Bełchatów lignite mine and power plant. What insights can be gained from observing the mine's size and its proximity to the power plant?
- How can satellite images be used to monitor the expansion and development of the Bełchatów lignite mine over the years? Discuss the benefits of using this technology to track changes in mining activity.
- Using the satellite images and the mine map, try to estimate the total area directly affected by the mine.
- Assess the effectiveness of satellite-based remote sensing in assessing the environmental impact of the Bełchatów mine and power plant. How can these images provide data on land degradation, deforestation, and carbon emissions?

#### Additional Material



*View of the Bełchatów lignite mine.*

#### Links and Sources

<https://www.sentinelvision.eu/gallery/pdf/5eebbd51621545aeaa09c27200d5608d> - Sentinel-1 and Sentinel-2 images of the lignite mine

<https://www.copernicus.eu/en/media/image-day-gallery/belchatow-coal-mine> - Sentinel-2 image of the lignite mine