Lusatian lignite is extracted free of subsidies in opencast mines. It is converted into electrical energy in the power plants nearby, in a safe, efficient and environmentally friendly way.

Mining preparation and water management

For safe opencast mining it is a prerequisite that the deposit is left free from water. Once the fore-field has been cleared, filter wells are drilled and using submersible pumps more than 220 m³ of groundwaer is pumped per minute to the surface. The water is pur- tified and then fed into the Spree and Weißer Schöps river. A portion of the pumped up water is used to supply ponds and wetlands worthy of protection in the open cast mine surrounding areas.

Overburden removal and dumping

Once the soil layers have been sufficiently drained, overburden excavators start their operations and remove the sand, gravel, and clay that lie above the lignite seam. In the Nochten open cast mine, two bucket-wheel excav- ators work ahead in the pre-cut of the overburden conveyor bridge (OCB). Conveyor belts transport the overburden masses removed to the mine’s dumpsite, which has been previously mined. Spreaders distribute this soil material with the fertile substrate on top and thus shape the relief of the future post-mining landscape. An overburden conveyor bridge, type F 60 – an equipment complex consisting of three highly efficient bucket-chain excavators and a conveyor belt which is over 600-metre-long is used to expose the lignite. 

Conveyor bridges are among the largest mobile tech- nical equipment systems in the world. They enable the transport of overburden over the shortest route across the mine to the dump side where it is dumped.

Coal extraction and transport

The lignite seam is mined between the pre-cut and the bridge operations. Pit operations run directly under the overburden conveyor bridge, bucket- wheel and bucket-chain excavators mine lignite from the second Lusatian lignite seam. The bucket-wheel excavators work predominantly on the high-cut, bucket-chain excavators can mine coal both with the high and low-cuts with their sawing ability of their bucket chain system (ladder).

Conveyor systems transport lignite to the coal loading station at surface level and from there into the power plant. Every day, up to 100,000 tonnes of lignite are extracted from the Nochten open cast mine. This is enough energy to cover the needs of a city.

And what about the environment?

For those involved in the mining business it is particu- larly challenging to compensate for the necessary inferences in the environment as quickly as possible and to prevent or limit to a minimum the impact of such measures on man by using state-of-the-art technology. Mining claims land and, at the same time, creates new land. Mining of lignite is always followed by recultivati- on of the mine-site area. Native tree species like pine, oak, maple, alder and beech are used for afforestation.

An approximately 260 hectare lake is being created south of Weißwasser, in the inner dumps of the open- cast mine. It will be reserved exclusively for nature con- servation purposes. Indigenous species will find shelter in the ‘Offenland’ and the ‘Moorinitiale’ of the surrounding area. The bouder park which is not far from the Boxberg power plant is also an example of such a landscaping design on a postmining area. Adjacent is a mountain bike track, a toehill graving and adventure playground.

Facts

1973 Beginning of coal extraction
1974 Commissioning of the overburden conveyor bridge, type F 60

Raw coal quality
Calorific value: approx. 8,750 kJ/kg
Water content: approx. 55.5 %
Sulphur: approx. 0.5 %
Ash: approx. 5.0 %

Overburden removal
Bucket-wheel excavator SFR 6300: approx. 12.700 m³/h
Bucket-wheel excavator SFRs 2000: approx. 5.000 m³/h
Overburden conveyor bridge F 60: approx. 25,600 m³/h

Coal extraction
Bucket-wheel excavator SFRs 1301: approx. 2.800 m³/h
Bucket-chain excavator EFRs 710: approx. 1.450 m³/h

Overburden-to-coal ratio
F 60: 1:4 [m³/m³]

Raw coal quality

Bucket-wheel excavator SFRs 2000: approx. 5.000 m³/h
Overburden conveyor bridge F 60: approx. 25,600 m³/h

Coal extraction
Bucket-wheel excavator SFRs 1301: approx. 2.800 m³/h
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Boxberg lignite-fired power plant

Energy means life. About a quarter of the total electricity generation in Germany is based on lignite – the most important domestic energy source which is supplied directly over a short route to the power plants.

Site and overview
The Boxberg power plant is located within the district of Görlitz, approx. 15 kilometres to the south of the Saxon town of Weißwasser. This raises the fuel utilisation ratio in the power plant making separate heat generation for the consumer no longer necessary.

Combustion in the steam generator
After the lignite has been crushed and ground into fine pulverised lignite in coal mills it is fed into the combustion chamber of the steam generator in a near dry state. The pulverised lignite is blown into the furnace through special burners with air flow that is a precisely measured 43.7 %. The heat generated during the coal combustion process is extracted from the process and used to for generated heat. The specific emissions (g/kWh) refer to net work including equivalent regulations.

Energy conversion in the generator
The steam expands as it travels across each blade of the turbine. Its energy is converted into kinetic energy. As both the turbine and the generator are mounted to one single shaft, the rotating motion is transmitted to the inductor of the generator which – like a dynamo of a bicycle - converts kinetic into electrical energy. The 3,000 revolutions per minute in the turbine corresponds to 50 Hertz, the frequency of alternating current. The electrical energy is transmitted to the substation at Badwede via overhead lines and at a voltage of 380 kilovolt from where it is fed into the high-voltage system of the company 50Hertz Transmission GmbH.

Environmental protection
The Boxberg power plant is certified according to the German laws governing all waste disposal businesses to dispose of sludge and to treat communal waste wa-
ter. Additional facilities in plant II make cogeneration, firing both waste and lignite together in the combus-
tion chamber possible, creating a synergy effect and contributing to an environmentally friendly disposal.

And what about the environment?
As with other fossil fuels, the combustion of lignite produces flue gas. The combination of highly efficient measures such as low nitric oxide combustion, flue gas desulphurisation with limestone suspension - a chemi-
cal process in which gypsum is produced - efficiently reduces emissions. Irrespective of the load that Boxberg power plant is operating at, it always remains below the limits stipulated in the environmental protection regulations.

Key figures

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<td>Unit N and P</td>
<td>Unit Q</td>
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<td>2 x 500 MW</td>
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<td>Unit efficiency (net)</td>
<td>43 %</td>
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<td>Live steam pressure</td>
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<td>Intermediate steam temperature</td>
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<tr>
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<td>Live steam pressure</td>
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