

5 | Ash

With the combustion of lignite, 1,500 tonnes of wet and dry ash are yielded daily. The wet ash is discharged by means of a scraper belt conveyor below the boiler. The ash dust which leaves the steam generator along with hot flue gases is almost completely separated in electrostatic precipitators. Wet and dry ash are disposed of or used as additives in industrial applications.

6 | Gypsum

The lignite has a low sulphur content which is transformed into sulphur dioxide (SO₂) during coal combustion. In the flue gas desulphurisation plant, there is a chemical reaction; sulphur dioxide reacts with the limestone suspension to yield gypsum. The greater portion of the gypsum yielded, is processed in construction industry plants located on the Schwarze Pumpe site. Remaining gypsum is supplied to other customers or transported to a depot.

7 | Limestone

Limestone is delivered by rail. It is crushed, mixed with water and used as reactant for binding sulphur dioxide contained in flue gas in the flue gas desulphurisation plant. The power plant requires approximately 1,000 tonnes of limestone each day.

8 | Purified flue gas

During the combustion of lignite flue gases arise which are thoroughly scrubbed and discharged via the cooling towers. Using modern technology such as low nitrogen combustion in the steam generator, electrostatic filters and a fluegas desulphurisation system, the legal emission limits are adhered to or undercut even further.

Power plant data	
Installed capacity	2 x 800 MW
Commissioning	1998
Mode of operation	Base load
Fuel	Lignite
Efficiency (net)	> 40 %
Steam boiler	
Construction	Once-through forced flow
Type of firing	Pulverised lignite
Steam output for each boiler	2,420 t/h
Live steam pressure	268 bar
Live steam temperature	547 °C
Reheat steam pressure	55 bar
Reheat steam temperature	565 °C
Pulverising mills per steam boiler	8
Turbine	
Type	Four-cylinder extraction condensing turbine
Nominal speed	3,000 rev/min
Generator	
Apparent power	1,000 MVA
Nominal voltage	27 kV
Cooling medium	Hydrogen
Generator Transformer	
Apparent power	1,100 MVA
Primary/secondary voltage	27/380 kV
Cooling tower	
System	Natural draught wet cooling tower
Height	141 m
Water throughput for each cooling tower	65,600 m ³ /h
Flue gas purification	
Denitrification	with primary measures
Dedusting (per boiler)	2 electrostatic filters
Desulphurisation (per boiler)	2 absorbers
District heating/process steam	
District heat extraction	2 x 60 MW _{th}
Process steam extraction	2 x 400 t/h

On site contact:
Kerstin Schilling
Standortkommunikation
Vattenfall Europe Generation AG
An der alten Ziegelei
03130 Spremberg
P +49 3564 35 3317
F +49 3564 35 3307
kerstin.schilling@vattenfall.de

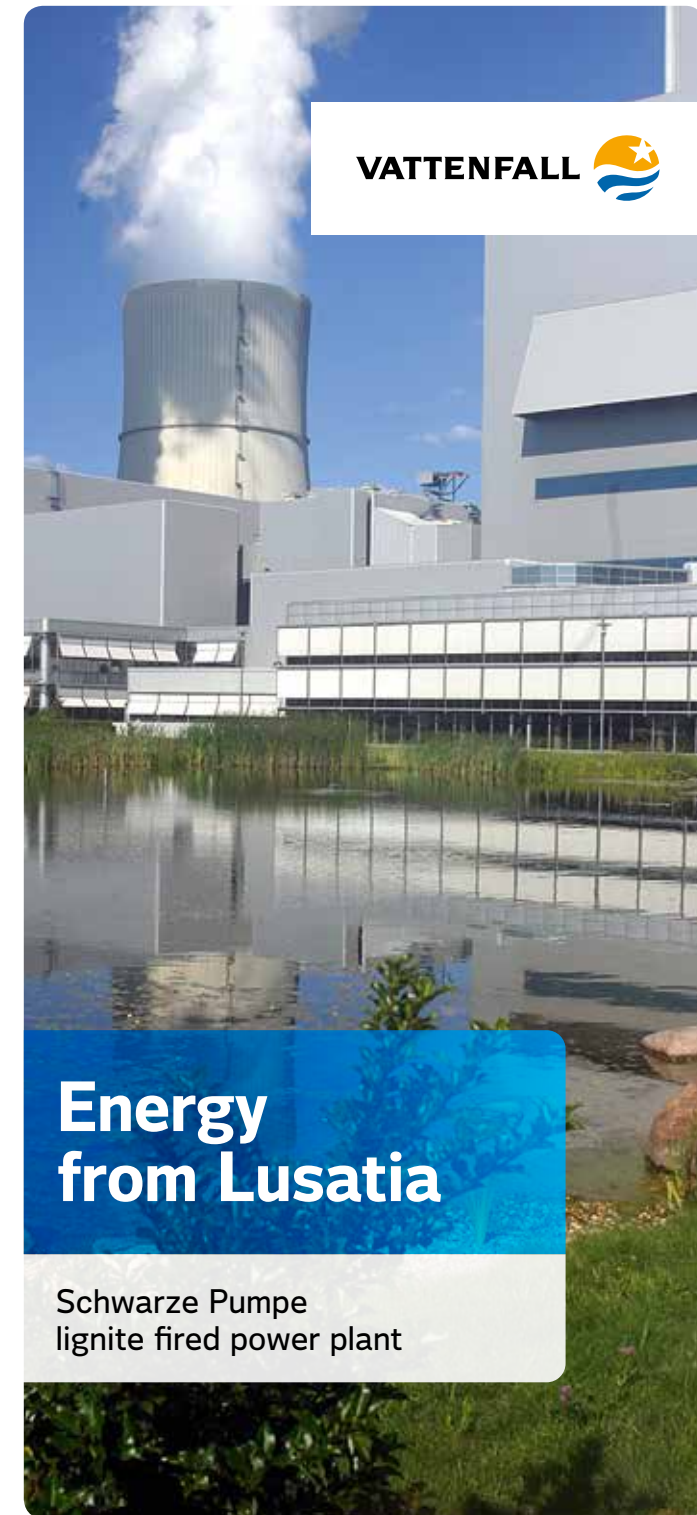
Production
Lignite Mining & Generation
Vom-Stein-Straße 39
03050 Cottbus

P +49 355 2887 3050
F +49 355 2887 3066

info@vattenfall.de
www.vattenfall.de
Vattenfall Europe Generation AG

VATTENFALL 

August 2013



Energy from Lusatia

Schwarze Pumpe
lignite fired power plant



Schwarze Pumpe Lignite Fired Power Plant

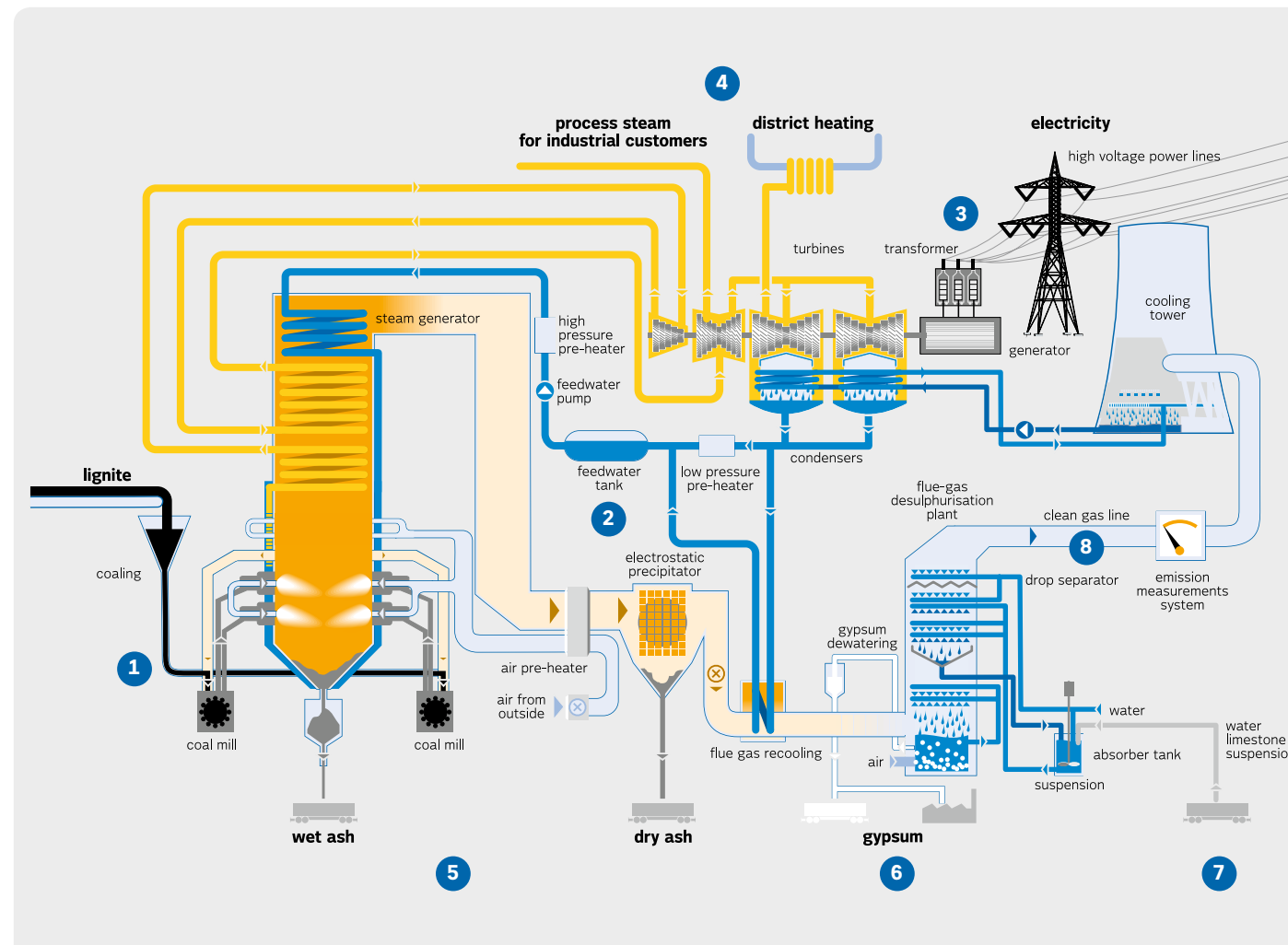
The Schwarze Pumpe power plant, with a total capacity of 1,600 megawatt (MW), generates electricity and heat for private households and industry around the clock, as well as under all weather conditions. It is located in Schwarze Pumpe, near the town of Spremberg in Brandenburg. Around 12 billion kilowatt hours (kWh) are fed into the public grid annually. This is enough to supply more than 3 million households with electricity.

For many years Vattenfall has been consistently modernising and reducing their carbon dioxide emission of their lignite power plants.

Directly next to the power plant in Schwarze Pumpe Vattenfall operates a research pilot plant to capture CO₂ and to dry lignite. Thus a foundation has been established to reduce the CO₂ emissions, as well as to increase efficiency and flexibility of the lignite power plants.

The Schwarze Pumpe lignite power plant is a double-unit plant with two 800-MW units. It is the first plant of a new generation of lignite-fired power plants ensuring reliable, economical, and environmentally acceptable electricity generation in Germany.

The plant, which went into operation in 1998, operates predominantly at base load and thus guarantees the stability of the high-voltage grid. At the same time the lignite fired power plant also balances the fluctuations resulting from electricity generated from wind and sun.



Schematic diagram of the power plant process

Each of the two 800 MW power plant units is able to operate flexibly and rapidly down to a theoretical block minima of 400 MW. Consequently optimal preconditions for implementing the Renewable Energies Act (EEG) can be met, of preferentially feeding electricity from renewable sources into the grid as the act stipulates.

The power plant Schwarze Pumpe is a certified plant to take processed waste for co-combustion.

1 | Lignite

The raw lignite is mined in the Welzow-Süd opencast mine nearby and transported by rail to the power plant. It is crushed, ground, dried and fed in a pulverized form into the steam generator. About 36,000 tonnes of lignite per day are needed to run the power plant at full capacity.

2 | Water

To generate steam and for cooling purposes water is required for the power plant. This water comes from the



dewatering system of the opencast mine and is treated mechanically and chemically before its use. Process water is used several times to reduce the demand to a minimum. Technological waste water is purified and returned to the general water cycle without the quality being compromised.

3 | Electricity

The electricity generated in the power plant is transmitted to the block transformers. It is then transmitted via 380-kV-overhead power lines of the network operator, 50Hertz Transmission GmbH to the Graustein transformer station. Finally public utilities and regional energy providers supply stable electricity to the consumers.

4 | District heat and process steam

Steam is released at various pressure stages. This is either used as process steam by external customers located on the industrial site or it is transformed into district heating, supplying the local municipalities.