



Pre-owned 50 MW Hard Coal fired Power Plant For Sale & Relocation

Presented by PRIOS Industry Systems & Services Ltd. Germany
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1. Description

1.1 Characteristics of the power plant

Construction: 1969
Type: condensation plant with fresh water cooling
Electrical output: 50/55 Megawatt (MW)
Fuel: hard coal, heav fuel oil (HFO)

Boiler: double pass once through boiler

Steam generation: 190 t/h

Live steam pressure: 90 bar

Live steam temperature: 530 °C

Design-pressure: 108 bar

Starts (cold/warm): 675 (179/496)

Generator: three phase synchronous genearator with
air cooling

Rated output: 55 MVA

Flue gas cleaning

Dedusting: electrostatic precipitator
dedusting level 99.8%

Nitrogen oxide reducing: two stage nitrogen reducing; primary measures by Urea injection and SNCR

Flue gas de-
sulphurisation plant: weg FGD (limestone system) efficiency > 95%

Final product: gypsum for building materials industry

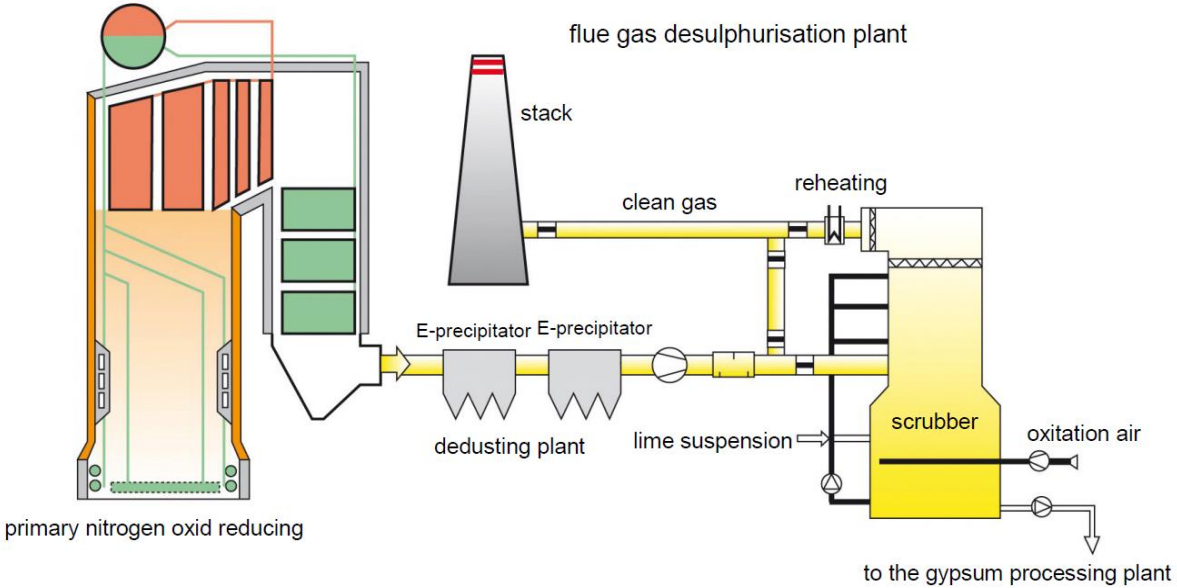
Combustion Installation

Hard coal combustion: 4 bowl mills to transfer auxiliary fuel
+ 2 beater wheels

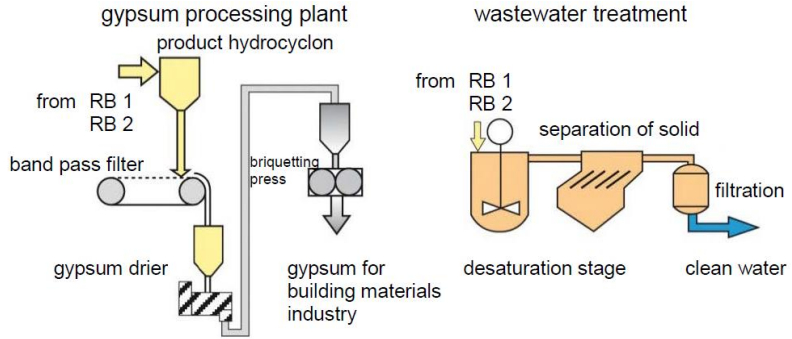
Oil combustion: 12 steam automising burners

Steam turbine: one casing condensing turbine with
single reheating and district heating

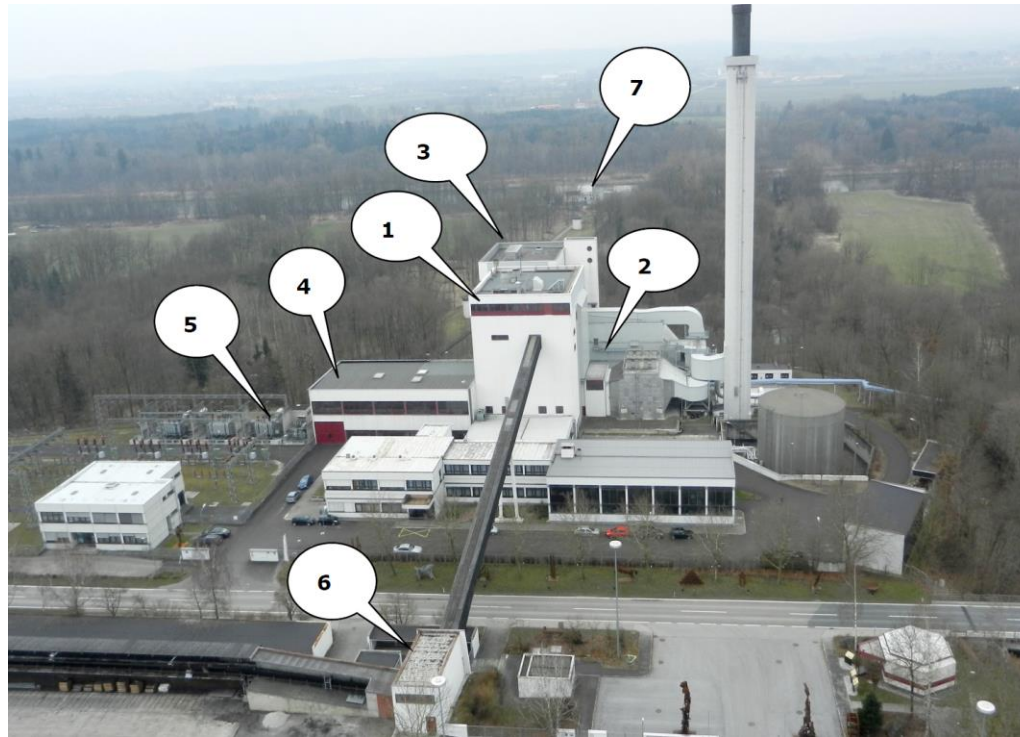
2. Environmental technology of the power plant



Common facilities with the neighbourhood power plant:



3. Main Components



1. Boiler
2. Electrostatic precipitator
3. Flue gas desulphurisation plant
4. Steam turbine
5. Transformers
6. Coal handling plant
7. Cooling water withdrawal building



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3.1 Boiler (first commissioning 1969)

Two pass natural circulation boiler with refractory walls (lightweight construction). The boiler is equipped with a pulverized coal combustion system and a forced draught fan, a Ljungström-air preheater and an induced draught fan. The flue gas cleaning system consists of a Denox by primary measures, 2 electrostatic precipitators and a wet FGD (limestone system, since 1994).

The originally combustion system, designed for lignite, was converted to hard coal in 1995. Heavy Fuel Oil is used for ignition and back-up.

Coal mills were manufactured in 1995.

2 bowl mills, manufactured by Loesche. Pulverized coal is conveyed by coal ducts to 4 layers, situated each in the corners of the combustion chamber.

Mills

Throughput: approx 9 t/h each
 Motor rating: 150 kW
 Rotation speed: 990 U/min

Primary air fan

Air flow: 9.0 m³/s
 Rotation speed: 1480 U/min
 Motor rating: 160 kW





3.2 Electrostatic Precipitation

Electrostatic precipitator 1 (manufactured in 1968)

Since the first commissioning of the plant (with lignite combustion) there is a 2-Zone Electrostatic precipitator. When erecting a FGD in 1993, an additional 2 Zone-Electrostatic precipitator was installed to meet the legal requirements. Fly ash separated from both precipitators is conveyed pneumatically to a day tank.

- Collecting plate area: 4.032 m²
- Precipitator efficiency: 98,0%
- High voltage unit: 111 kV

Electrostatic precipitator 2 (manufactured in 1993)

- Collecting plate area: 3.650 m²
- Precipitator efficiency: 99,85%
- High voltage unit: 111/65 kV

3.3 Flue Gas desulphurization (FGD – built in 1993)

This plant consists of a main wet scrubber. Sulphur from the flue gas is removed by limestone suspension and processed to gypsum by further steps.

Flue gas flow:	260.000 m ³ /h
SO ₂ in crude flue gas:	Design max 4.000 mg/m ³
SO ₂ in cleaned flue gas:	max 200 mg/m ³ (emission limit)
Degree of desulphurization:	greater than 90%
Dust in cleaned flue gas:	max 30 mg/m ³
Flue gas temperature (stack):	90°C





3.4 Steam Turbine

3.4.1 Steam Turbine

Horizontal split single casing condensing turbine with 6 extractions for the purpose of feed water preheating, single flow steam exhaust and surface condenser. The turbine was converted in 1980 to supply district heating.

First commissioning:	1969
Turbine:	Siemens
Power output:	55.000 kW 50.000 kW with 10.000 kWth district heating
Live steam temperature:	525°C
Live steam pressure:	90 bar
Live steam flow:	190 t/h
Rotational speed:	3.000 U/min



3.4.2 Generator

The generator is coupled rigid to the turbine. It is a 2-pole three-phase alternator with static field excitation.

First commissioning:	1969
Generator:	WSW – Type FT 520/62-2
Rated output:	62.500 kVA
Nominal voltage:	10,5 kV
Nominal amperage:	3440 A
Rotational speed:	3.000 U/min





3.4.3 Feed water pumps

2 electrically driven speed controlled full load high pressure centrifugal pumps.

First commissioning:	1969
Pump:	Halberg – Type HS 125x5,5 stuffing
Delivery rate:	254 t/h
Delivery head:	1405 m
Range of rotational speed:	1500 – 4530 U/min
Geared variable-speed coupling:	Voith – Type 15 RK
Three-phase asynchronous motor:	ELIN – Type KV7504-520 – 1250 kW, 6,3 KV, n=1489 U/min



3.4.4 District heating supply system

Steam from extraction 3 respectively 4 is used to heat the district heating supply water.

First commissioning:	1980
Surface heat exchanger:	Loos
Supply water flow:	285 m ³ /h
Supply water temperature:	86° - 116° C floating with ambient air temperature
Heat load:	10.000 kW
Nominal pressure:	10 bar



Heat exchanger for district heating

3.5 Transformers

Unit transformer and station service transformer.

First commissioning:	1969
Unit transformer U1	Oil transformer with step switch EBG-Type DO 60000/110
Apparent power:	60.000 kVA
Upper voltage:	125 kV
Lower voltage	10,5 kV
Station service transformer U 20:	Oil transformer with step switch ELIN – Type ODL 6300/20
Apparent power:	5.500 kVA
Upper voltage:	10 kV
Lower voltage:	6 kV



Unit transformer



Station service transformer

3.6 Coal handling plant

Coal supply for the power plant is maintained by an ascending conveyor gantry to an elevated bin consisting of two coal bunkers. Coal can take the way directly from the railway siding or from the coal dump.

During the outage of the units coal delivery can keep on and coal is stored at the coal dump, where it is distributed and compresses by wheel loader.

Capacity of conveyors from railway siding: 250 t/h

Capacity of conveyors to the power plant: 250 t/h

3.7 Cooling water withdrawal building

The building is situated on the banks of the river nearby. Mechanical cleaning is done by trash racks and screening machines. There are 2 vertical speed controlled full load centrifugal pumps for cooling water delivery.

First commissioning: 1969

Cooling water pumps: Andritz – Type 300ax740

Delivery rate: 5100 m³/h

Delivery head: 24 m

Range of rotational speed: 575 – 736 U/min

Three-phase asynchronous motor: ELIN – Type RS4608n-580 450 kW, 6,3kV, n=736 U/min



Outside view



Inside view

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