Welcome to Walsum Power Plant

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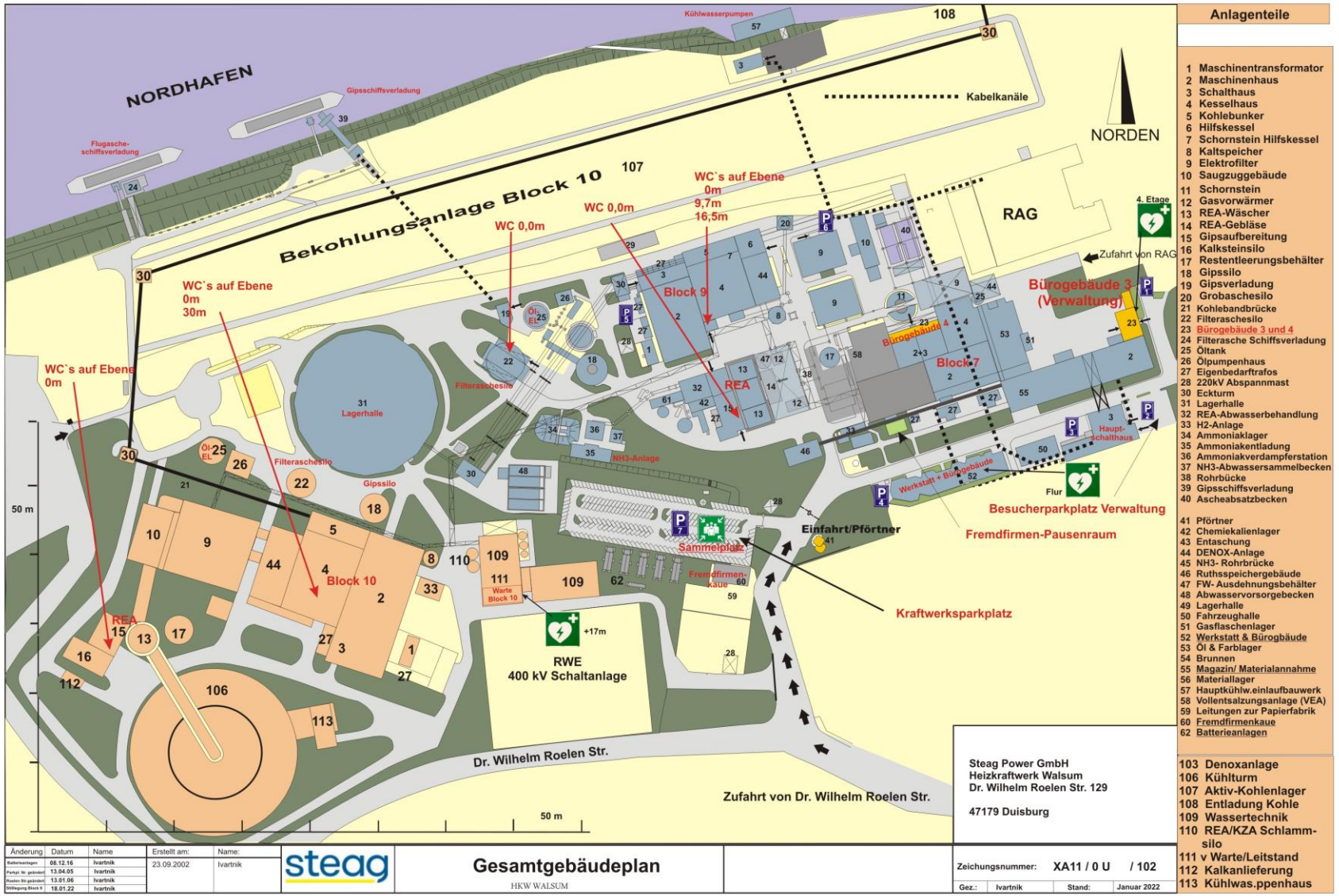
Safety Instruction

In order to ensure your safety during your visit, please note the following points:

- Emergency number: 0203 / 4996 – **200**
- The instructions of the supervisory staff must be followed
- Defibrillators and assembly points are marked on the site layout plan:
- General rules & prohibitions:



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Key Figures

KW Duisburg-Walsum

Walsum Power Plant stands for tradition and reliable energy production

The power plant was built in 1928 to cover the steam needs of the coal mine. In the course of the further development and expansion of the site, the plant supplied the industry and public with electricity, process steam and district heating. With the commercial takeover of unit 10 in 2013, STEAG has had a highly efficient and reliable unit. Unit 9 was shut down on July 8, 2021 as part of the German coal phase-out program.

	Unit 10
Installed Capacity (gross/net)	790 MW_{el} / 725 MW_{el}
Thermal Output	1783 MJ/s
Steam Output	610 kg/s (2196 t/h)
Steam Parameter (SH)	275 bar / 603 °C
Steam Parameter (RH)	66,2 bar / 621 °C
Fuel	Bituminous Coal
Mill Capacity (4 MPS)	280 t/h
First Commissioning	2013

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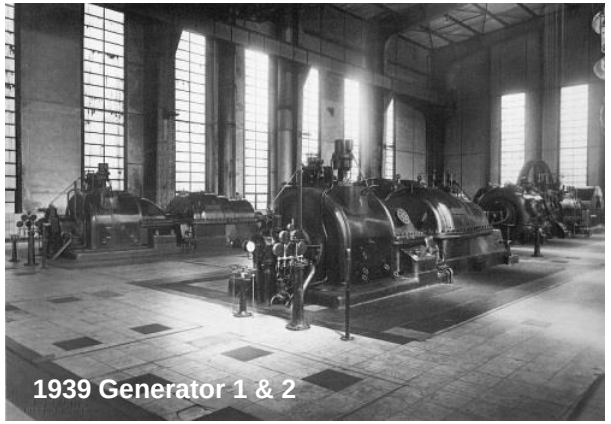
History


1914-34 Errichtung des Bergwerks Walsum


1928-39 Errichtung erster Anlagen für den Energiebetrieb der Schachtanlage Walsum
18.9.39


1937 Errichtung des Hafens
11.1.37.


2013 Generator 10


1939 Generator 1 & 2


2013 Inbetriebnahme Block 10


1988 Inbetriebnahme Block 9


1959/60 Inbetriebnahme der Blöcke 7/8

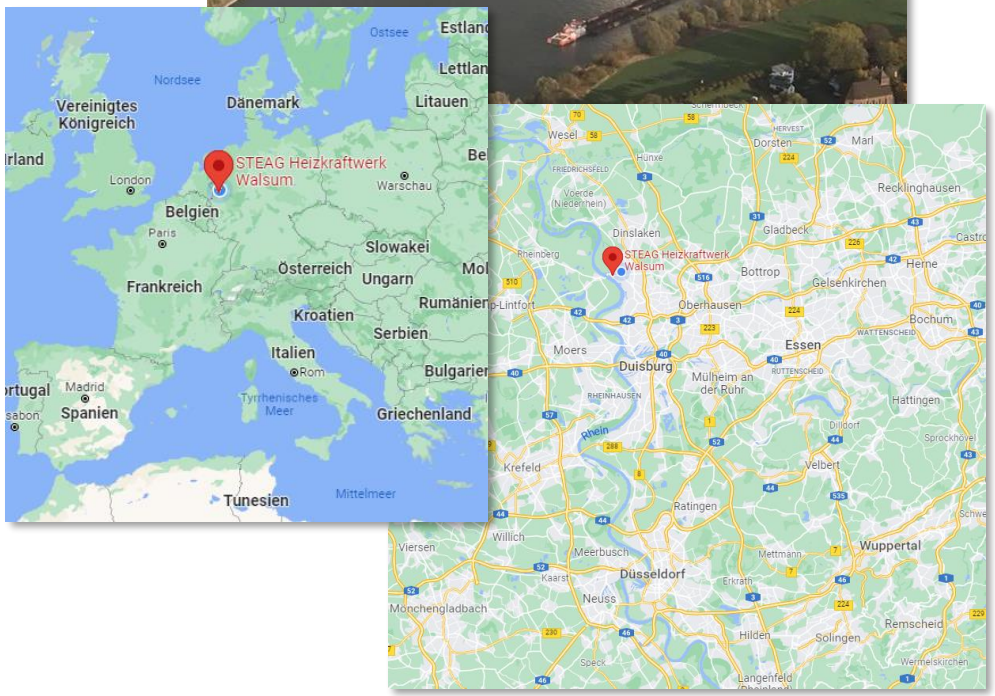
Historie

The Walsum site stands for tradition and change in energy production

The power plant was built at the Duisburg-Walsum site in 1928 to cover the steam requirements of the coal mine. In 1957 the plant was expanded to include unit 6 with 68 MW, followed in 1959 and 1960 by two further units (unit 7 and 8) each with 150 MW (129 MW net output).

In 1988 Block 9 replaced Blocks 6 and 8. The unit had a gross electrical output of 410 MW (370 MW net output) and a district heating output of 295 MW. The block was finally shut down on July 9, 2021. as part of Germany's coal exit program.

The construction of block 10 started in 2006 and after various technical problems and delays, the boiler was fired for the first time in April 2013 after the extensive rehabilitation. Commercial operation began in December 2013 with a gross capacity of 775 MW (net capacity 725 MW).



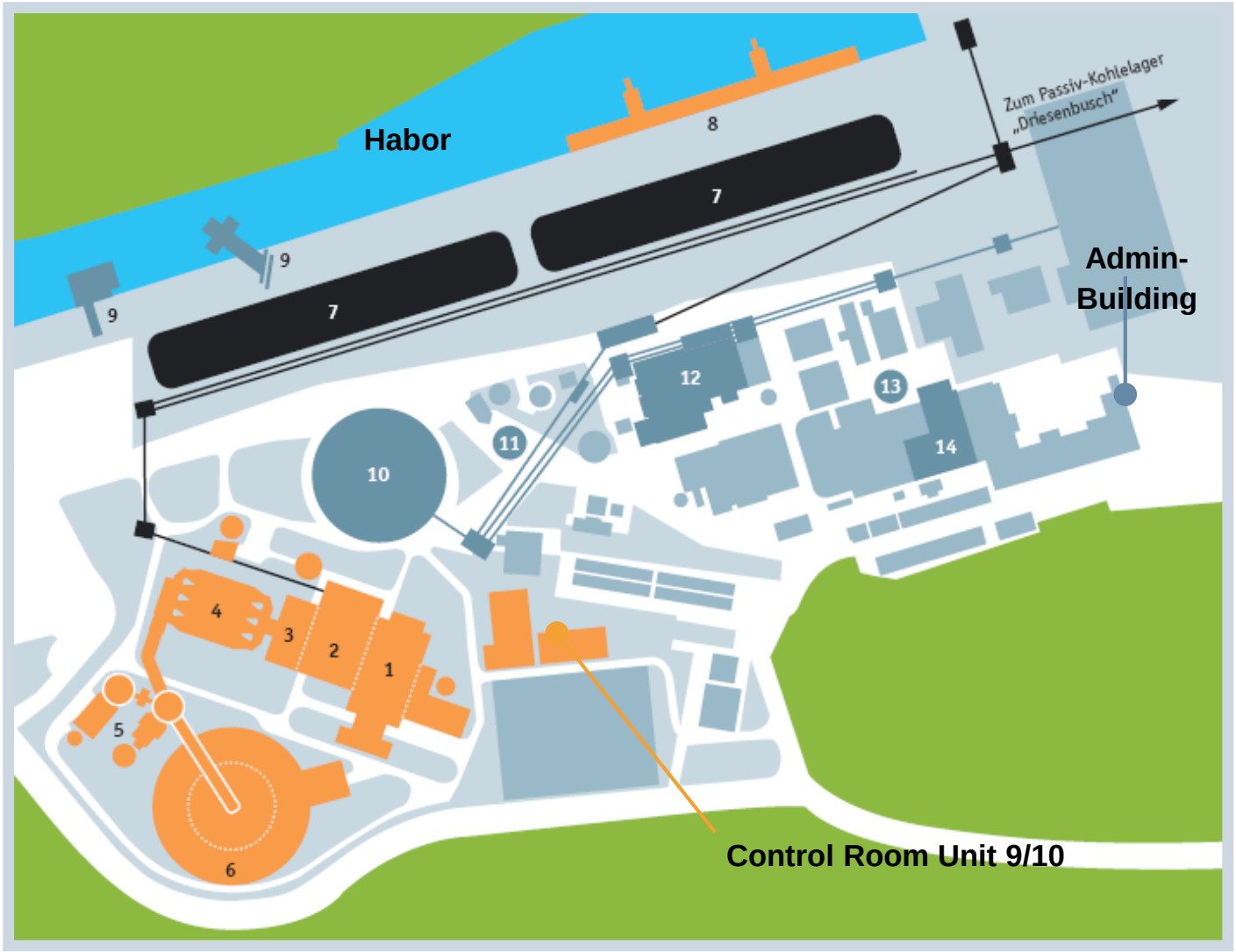
Plant Layout

Unit 10

1 : Turbine hall
2 : Boiler house
3 : DeNOx
4 : ESP
5 : FGD
6 : Cooling Tower
7 : Coal storage yard
8 : Ship unloading

Unit 9

9 : fly ash / gypsum ship loader
10 : Coal storage yard
11 : Fly ash silo
12 : Turbine hall,
boiler house
DeNOx
13 : Stack



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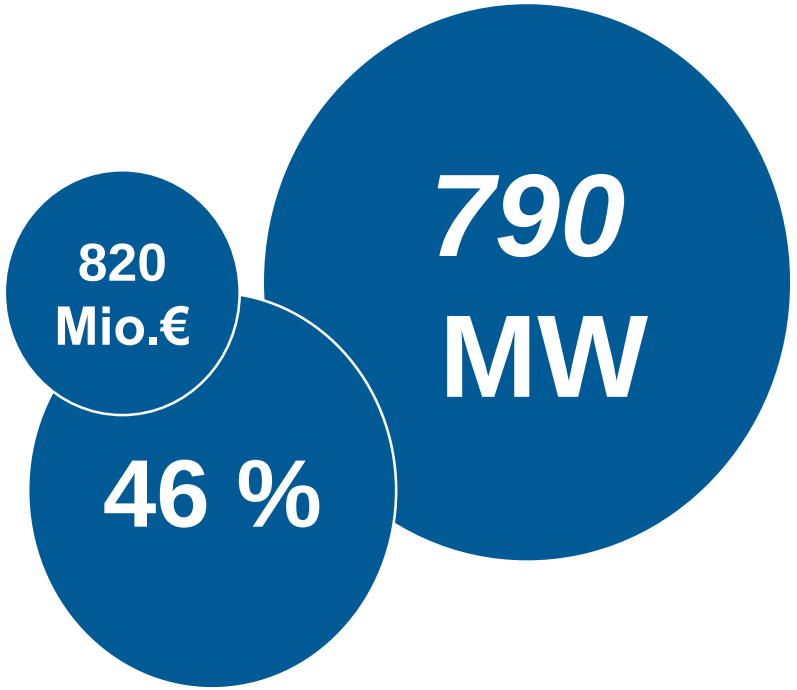
Walsum 10

One of the most modern power plants in Europe

The Walsum 10 power unit was commissioned with a gross electrical output of 790 MW, an efficiency of 46 percent and an investment of 820 million EUR - for the Project Company and its main shareholder STEAG GmbH an investment in one of the most modern and efficient coal-fired power plants in Europe



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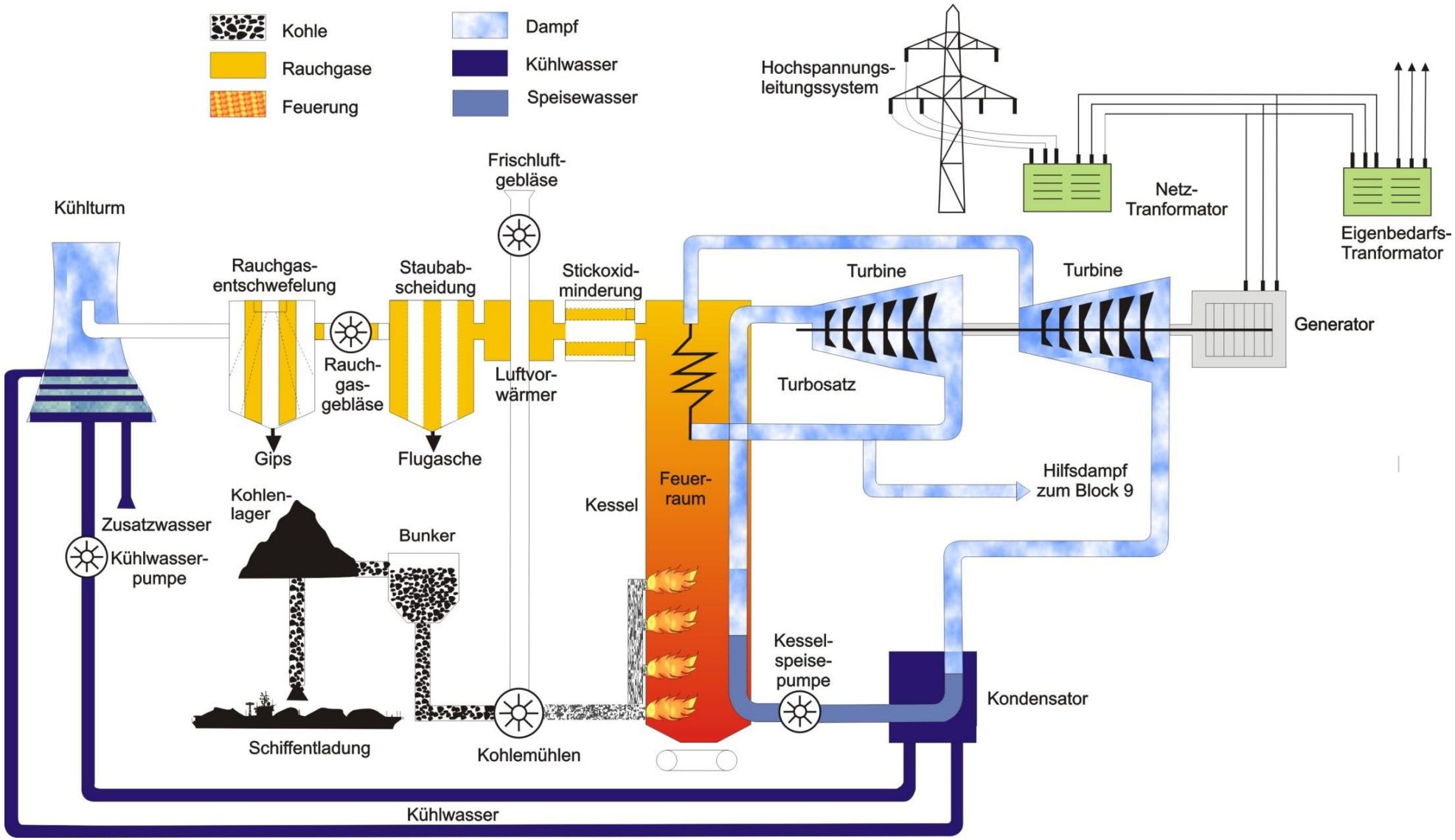
Power Plant Process



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Power Plant – Main Components

Coal Handling

The coal is delivered by **ship** via the port of Walsum. The coal store yard, designed as a **longitudinal storage**, has a capacity of **4 x 30,000t (total: 120.000t)** and lasts for **20 days** at full load.

Steam Generator

The steam generator designed as a **Benson boiler** with **reheating** (ZÜ) has a thermal output of **1,783 MJ/s** and thus generates a steam output of **610 kg/s** (2,196 t/h) at **274 bar** and **603 °C**. The RH steam has a temperature of **621 °C** at a steam pressure of **66.2 bar**.

Firing System

The Firing System consists of 16 **pulverized coal burners** on **4 burner levels**, which are each arranged on the front and rear wall of the combustion chamber of the steam generator. Each burner level is supplied with pulverized coal by a **vertical roller mill** with a grinding capacity of **60 t/h (total: 240 t/h)**

Power Plant – Main Components

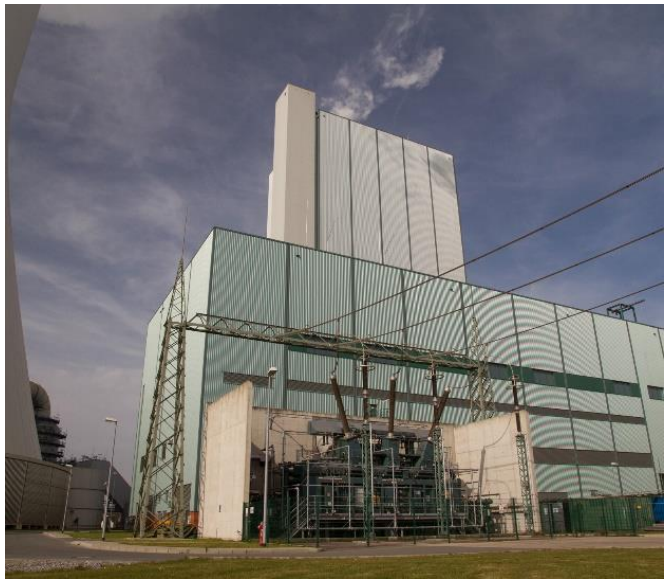
Steam Turbine

The compact three-casing HP/MP (11-stage/9-stage), LP (2 x 7-stage), single-shaft, **condensing turbine** with single reheating takes the steam through the turbine valves and generates at a speed of **3000 rpm** a power output of **790 MW**.

Generator

The fully encapsulated, self-ventilated, hydrogen-cooled 2-pole synchronous generator with a cylindrical rotor generates an electrical energy of **962 MVA** at a terminal voltage of **21,000 V**.

The generator consists of a rotor (95 t) and stator (385 t) and has a total weight of **480 t**



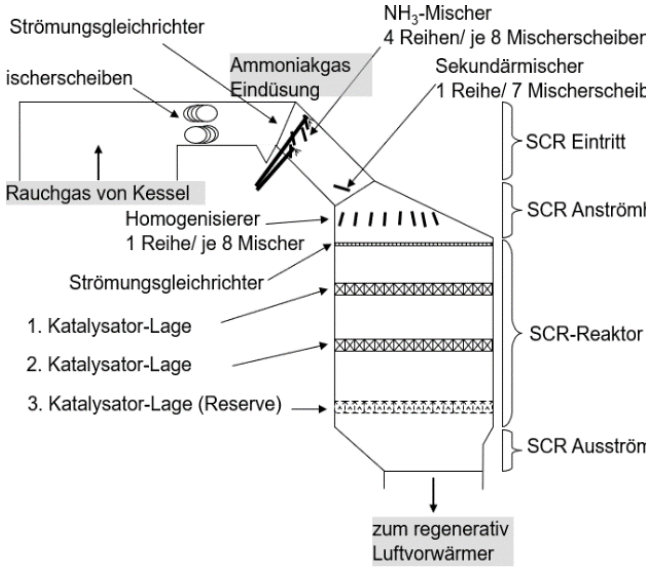
Machine Transformer

The machine transformer has an output of **890 MVA** at a nominal voltage of **420 KV**.

407 t had to be moved for transportation to the power plant.

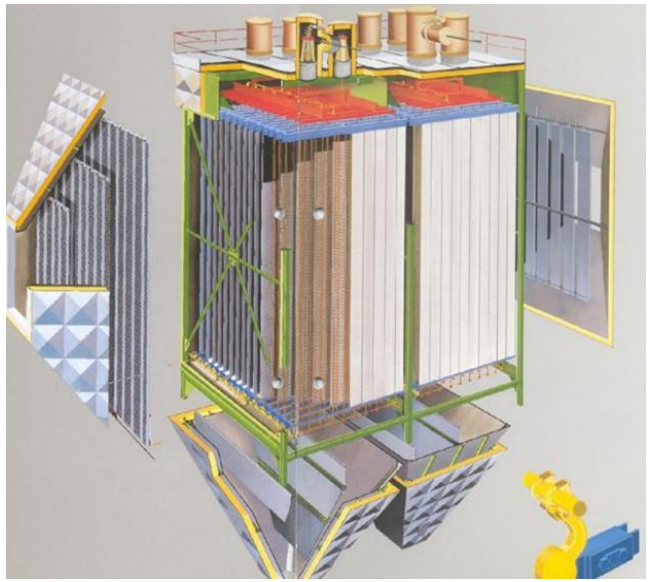
Filled with oil, the transformer has a total weight of **512 t**

Power Plant – Main Components



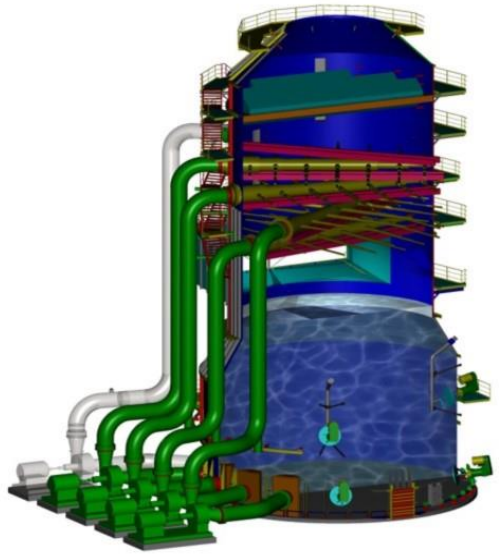
SCR Reactor

In the SCR Reactor (DENOX) behind the steam generator, nitrogen oxides (**NO** and **NO2**) in the flue gas are converted into molecular nitrogen (N2) and water vapor (H2O) in a **catalytic process** by injecting **gaseous ammonia (NH3)** and with help of **catalysts**.



Electrical Precipitator

In the **3-line dry electric filter**, the dust particles contained in the flue gas are physically accumulated in 5 zones each by the effect of an electric field (DC voltage) between spray and precipitation electrodes, mechanically tapped off and pneumatically discharged.



Flue Gas Desulfurization

In the absorber of the FGD, the sulfur (SO2) contained in the flue gas is separated using the wet absorption process. In a chemical reaction with lime (CaO) dissolved in water, gypsum is formed, which is further used in the construction industry.

Power Plant – Main Components

Water Treatment

The water treatment plant consists of the **Cooling Tower Water Treatment Plant** (KZA), the **Condensate Cleaning Plant** (KRA), a full **Desalination Plant (VEA)** and a **Plant for Treating the Waste Water** from the flue gas desulfurization plant (RAA)..

Cooling Tower

The Wet Cooling Tower has a height of **181 m** and generates a cooling water volume of **58,100 m³/h**. It takes a clean gas volume of **2,065,353 Nm³/h** and transfers this to the atmosphere by means of natural draft.

Control System

The **Control System** completely maps the power plant process, makes it remotely controllable from the **central control room** and automates it in such a way that the plant can **be controlled** by the staff with the greatest possible **safety** and **availability**.

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Facts & Figures

Height
Cooling Tower
181 m

Boiler House
Weight
10.000 t

Boiler
Test Pressure
561 bar

Number of
field welds in
Boiler
35.000

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Large battery systems

STEAG operates a large battery system at the Walsum site to provide primary balancing energy.

- Installed Power: **15 MW**
- Battery capacity: **> 20 MWh**
- Use of existing infrastructure
- Connection on the 10 kV level
- Use of established **lithium-ion technology**
- **Modular structure** of the large battery systems
- 10 storage units in container design with batteries and converters
- Official opening on **November 17, 2016** at the Walsum site

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Future Projects

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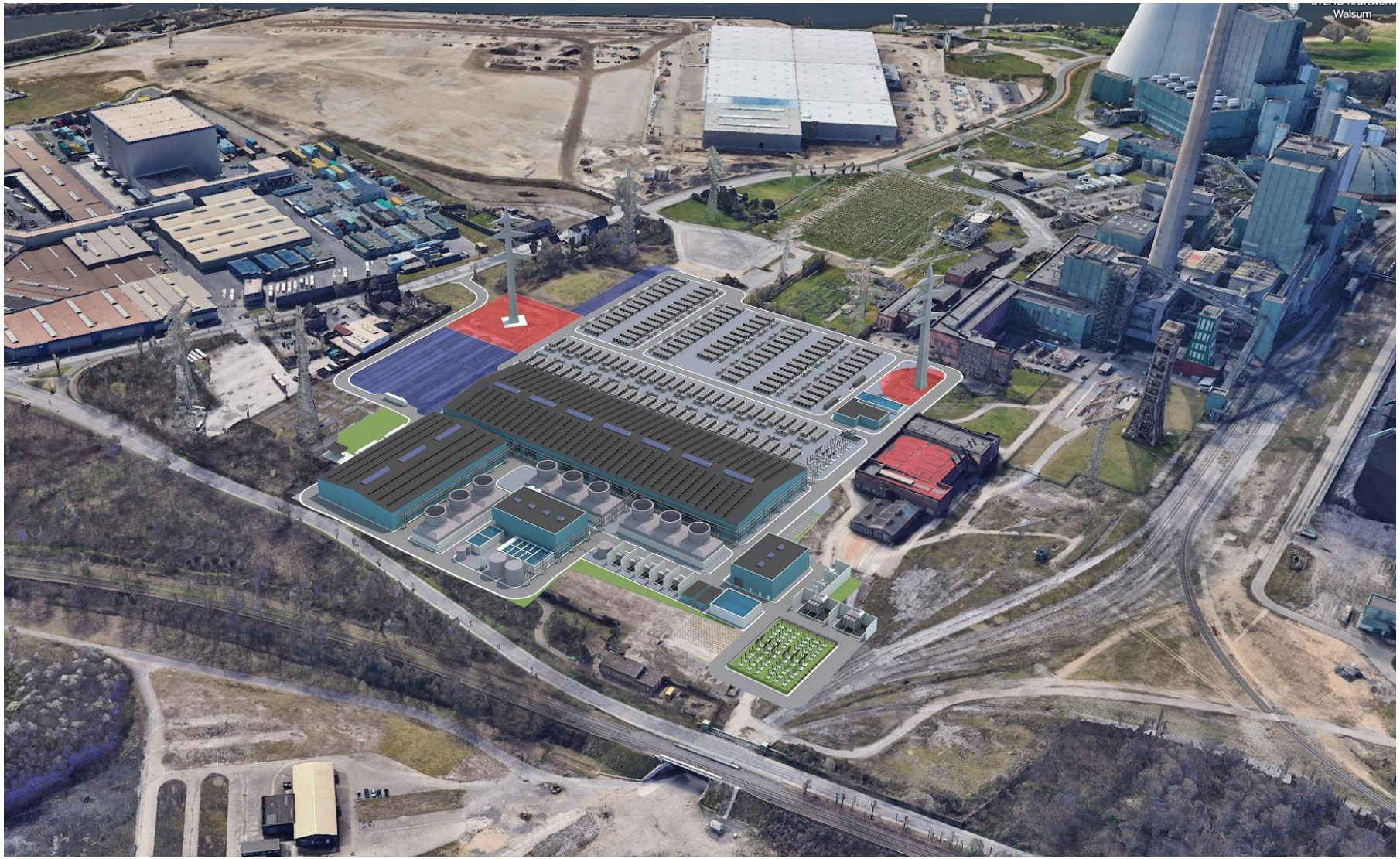
Future Projects



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Thank you for your attention !

For questions and further information I am at your disposal:

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