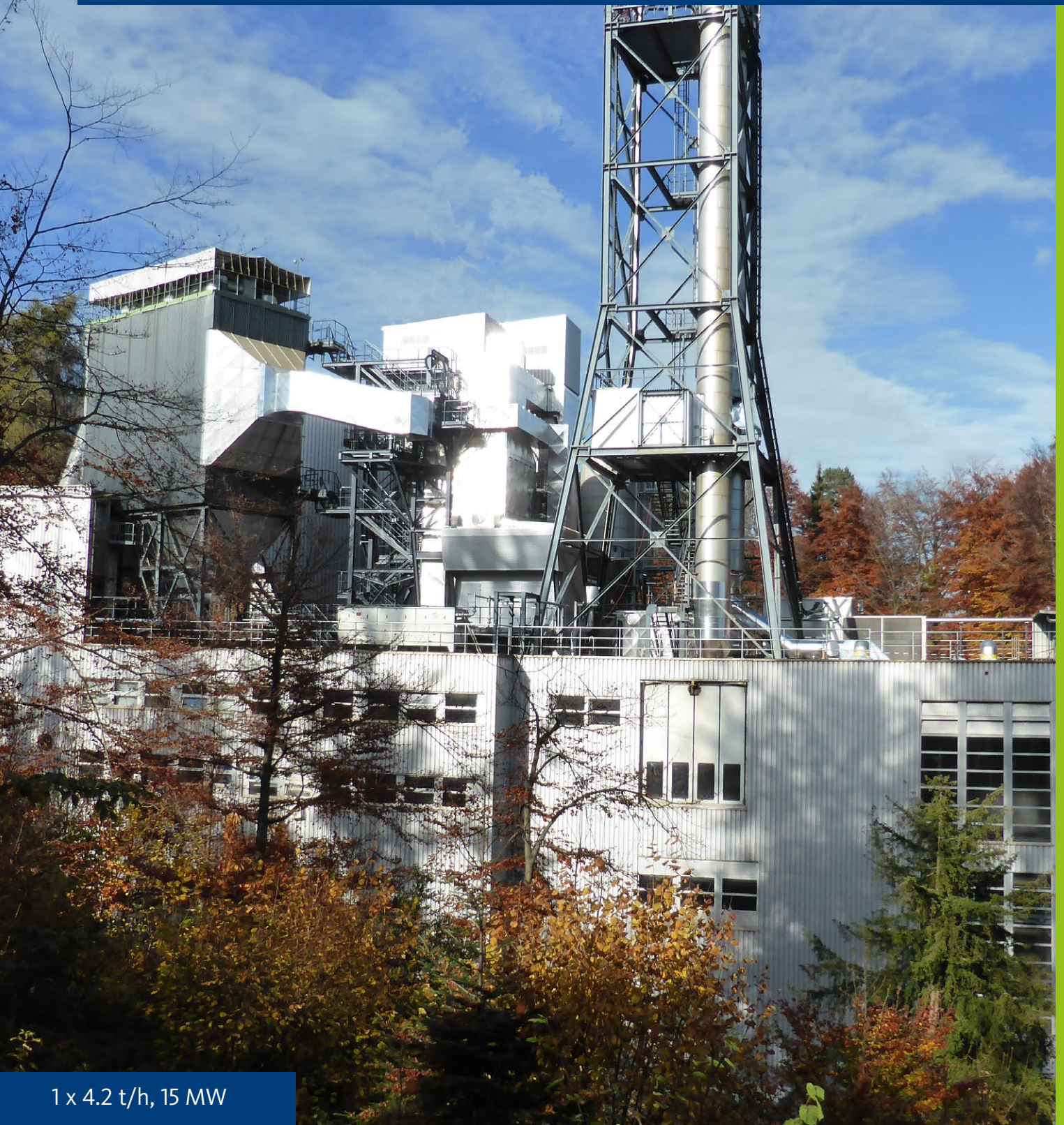


Hitachi Zosen  
INOVA

Horgen / Switzerland  
Waste to Energy Plant



1 x 4.2 t/h, 15 MW

## KVA Horgen – Pioneering Innovations for Greater Efficiency and Maximum Resource Recycling

Innovative technologies from Hitachi Zosen Inova (HZI) enable the continued operation of KVA Horgen with significant improvements in energy efficiency. As one of the first Waste to Energy (WtE) Plants worldwide with dry bottom ash discharge, KVA Horgen holds a pioneering role regarding future-oriented material recycling.

### | Low Excess Air

Combustion control and dry bottom ash discharge systems developed by HZI have enabled KVA Horgen to usher in a new era. Thanks to a retrofit and the renewal of various components, the WtE plant will be able to handle the controlled combustion of household waste from the entire Horgen area at lower excess air. This has a number of key advantages:

- lower flue gas volumes
- maximum heat utilization in the boiler
- reduced NO<sub>x</sub> production
- lower process costs and utility consumption

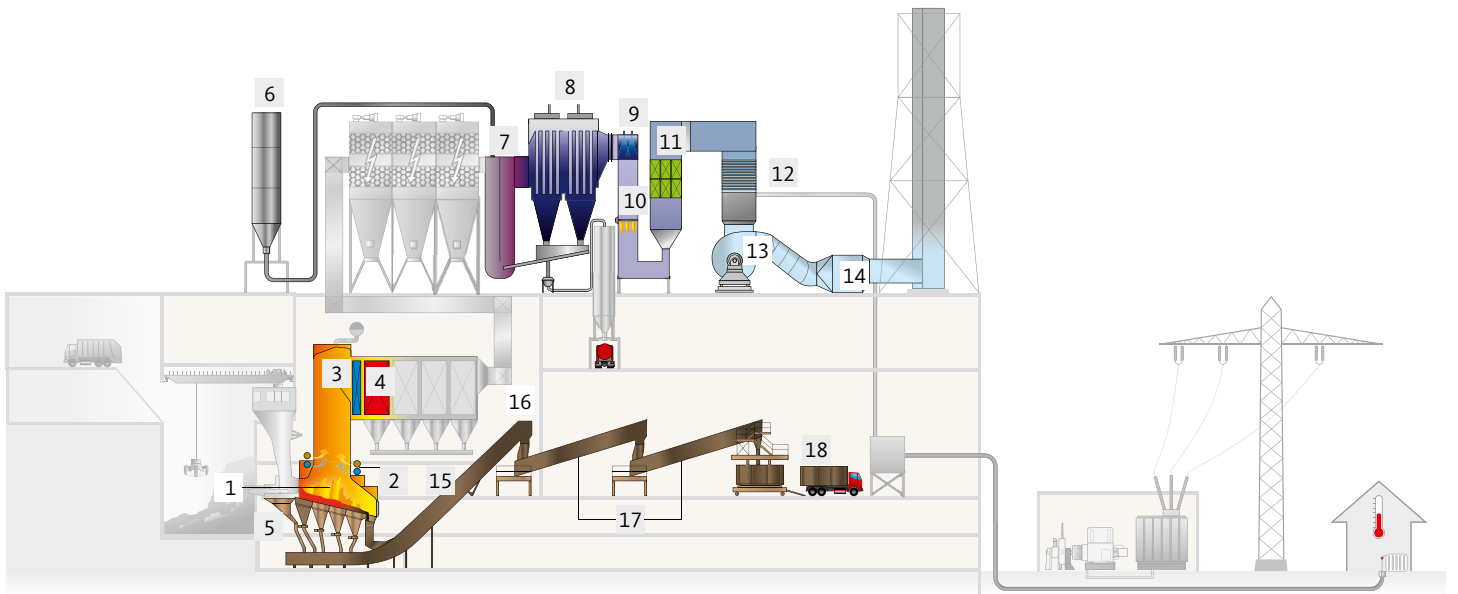
Even though the new combustion technology requires more sophisticated controlling, ground-breaking combustion management possibilities mean operations are nevertheless more stable than with traditional control systems and energy utilization is therefore subject to more effectiveness.

Despite considerable price competition from abroad, the new steam boiler and other components were manufactured entirely in Switzerland. This was a key factor in ensuring that the exceptionally short engineering and construction deadline of just 14 months could be met. The improved boiler line was operated using the existing flue

gas treatment unit until the new FGT system was complete, and the changeover was then carried out in just three days. The new equipment was commissioned without any problems, allowing HZI to hand over the plant for commercial utilization within minimum time.

### | Dry Bottom Ash Discharge

The system for the dry discharge of bottom ash is also new. Most plants feed the slag into a water-filled wet extractor for cooling. This changes the chemical composition, particularly of the fine fraction, and makes it difficult, if not impossible, to extract valuable non-ferrous metals such as aluminum, zinc, copper, and small amounts of gold contained in the bottom ash. The new dry discharge system maximizes the recovery of materials sent for recycling to ZAV Recycling AG in KEZO Hinwil, a facility commissioned in April 2016, that processes bottom ash from several Swiss plants. Various valuable fractions are recovered which are then fed back into the economic cycle as raw materials, also in keeping with the concept of urban mining. As a result, there is also much less bottom ash to dispose of in landfill than with existing processes. KVA Horgen is one of the first plants in the world to initiate this innovative, environmentally friendly approach to dry bottom ash discharge.



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#### Combustion and Boiler

- 1 HZI Grate
- 2 Secondary air
- 3 Evaporator
- 4 Superheater
- 5 Grate riddlings & primary air

#### Flue Gas Treatment

- 6 Additive silos (Bicar)
- 7 XeroSorp® reactor
- 8 Fabric filter
- 9 Ammonia water injection
- 10 Regeneration burner
- 11 Catalizer
- 12 Flue gas heat exchanger
- 13 Inducted draft fan
- 14 Silencer

#### Residue Handling and Treatment

- 15 Dry bottom ash conveyor with integrated cooling
- 16 Air seal with coarse parts separator
- 17 Conveyors
- 18 Dry bottom ash loading terminal

#### Efficient Flue Gas Treatment

Flue gas is now also treated without waste water. The retrofit at Horgen involved the installation of a very compact solution that minimizes the use of chemicals thanks to the integrated recirculation of residues. An energy-saving low-temperature catalyst is used to separate nitrogen oxide (NO<sub>x</sub>). Because the catalizer and filter are modular in

construction, they can be pre-assembled and built into the existing facility in the shortest possible time. This project marks a key milestone for HZI going forward – not least because it was able to deliver customized in-house technology that will allow KVA Horgen to run at enhanced efficiency through to the expiry of its current operating license.

#### General Project Data

Owner and operator	Zweckverband für Abfallverwertung im Bezirk Horgen / KVA
Commissioned	2015
Total investment	CHF 16 million
Scope of HZI	Combustion system, boiler parts, dry bottom ash conveyor, flue gas treatment XeroSorp®, energy recovery, electrical and control systems

#### Technical Data

Annual capacity	35,280 t (= 4,2 t/h)
Number of lines	1
Throughput	2.94 t/h – 5.14 t/h
Calorific value of waste	9.0 MJ/kg (min.)–15.5 MJ/kg (max.)
Thermal capacity	15 MW (nom.)
Waste type	Commercial and municipal waste

#### Combustion System

Grate type	HZI Grate AR-128024
Grate size	Length: 8.5 m, width: 2.4 m
Grate cooling	First two zones water-cooled (Aquaroll®)

#### Boiler

Type	Two-pass boiler (2nd existing), horizontal
Steam quantity	17.8 t/h
Steam pressure	30 bar
Steam temperature	380 °C

#### Flue Gas Treatment

Concept	Electrostatic filter (existing), bag filter, SCR DeNO <sub>x</sub> , district heating heat exchanger
Flue gas volume	26,400 m <sup>3</sup> /h
Flue gas temperatures	120 °C (stack)

#### Residues

Dry bottom ash discharge	4,800 t/a
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