Horgen / Switzerland
Energy-from-Waste 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 enable the continued operation of KVA Horgen with significant improvements in energy efficiency. As one of the first EfW 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 Hitachi Zosen Inova (HZI) have enabled KVA Horgen to usher in a new era. Thanks to a retrofit and the renewal of various components, the energy-from-waste 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 NOx 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.
### 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 (NOx). Because the catalyst 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

<table>
<thead>
<tr>
<th>Owner and operator</th>
<th>Zweckverband für Abfallverwertung im Bezirk Horgen / KVA</th>
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</thead>
<tbody>
<tr>
<td>Commissioned</td>
<td>2015</td>
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<tr>
<td>Total investment</td>
<td>CHF 16 million</td>
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<tr>
<td>Scope of Hitachi Zosen Inova AG</td>
<td>Combustion system, boiler parts, dry bottom ash conveyor, flue gas treatment Xerosorp+, energy recovery, electrical and control systems</td>
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</tbody>
</table>

## Technical Data

<table>
<thead>
<tr>
<th>Annual capacity</th>
<th>35,280 t (= 4.2 t/h)</th>
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<tbody>
<tr>
<td>Number of lines</td>
<td>1</td>
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<tr>
<td>Throughput</td>
<td>2.94 t/h – 5.14 t/h</td>
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<tr>
<td>Calorific value of waste</td>
<td>9.0 MJ/kg (min) – 15.5 MJ/kg (max)</td>
</tr>
<tr>
<td>Thermal capacity</td>
<td>15 MW (nom)</td>
</tr>
<tr>
<td>Waste type</td>
<td>Commercial and municipal waste</td>
</tr>
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### Combustion System

- **Grate type**: Hitachi Zosen Inova Grate AR128024
- **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 DeNOx, district heating heat exchanger
- **Flue gas volume**: 26,400 m³/h
- **Flue gas temperatures**: 120 °C (stack)

### Residues

- **Dry bottom ash discharge**: 4,800 t/a