

Hitachi Zosen
INOVA

Lausanne / Switzerland
Waste to Energy Plant



Replacement 2 x 12.5 t/h, 40 MW

Tridel – Environmentally-friendly Thanks to Maximized Metals Recovery and Minimal Emissions

High energy efficiency, low emissions, virtually no visible plumes of steam: The new Waste to Energy plant in Lausanne, in the Canton of Vaud, meets all the standards for a facility located near this urban recreational area. Built using the latest technology, this new plant has now replaced what was once the world's oldest one still in operation.

| Pioneer in Thermal Waste Treatment

Lausanne became a pioneer in thermal waste treatment when its plant, designed by Hitachi Zosen Inova (HZI), went online in 1958. Forty-eight years later, it had become the world's oldest incinerator still in service. In 2006 when it was replaced by a larger and more efficient new facility capable of treating most of the waste generated in the canton of Vaud.

| Strict Requirements Imposed on New Plant

The new facility had to meet ambitious Tridel SA expectations: very low emissions, maximized energy output, economical operation and high availability. The decisive factors in awarding the contract to HZI were the company's proven technology, experience, a high degree of technical competence and a long-standing partnership.

The new plant comprises two process trains, each with a capacity of 12.5 Mg/h, a boiler in a cogeneration scheme, a flue gas treatment unit ensuring minimal emissions, and a system to recover reusable materials.

| Environmental Protection Begins with Delivery

A key asset of the plant is environmentally safe delivery of the waste by rail. Three-fourths of the waste, from around

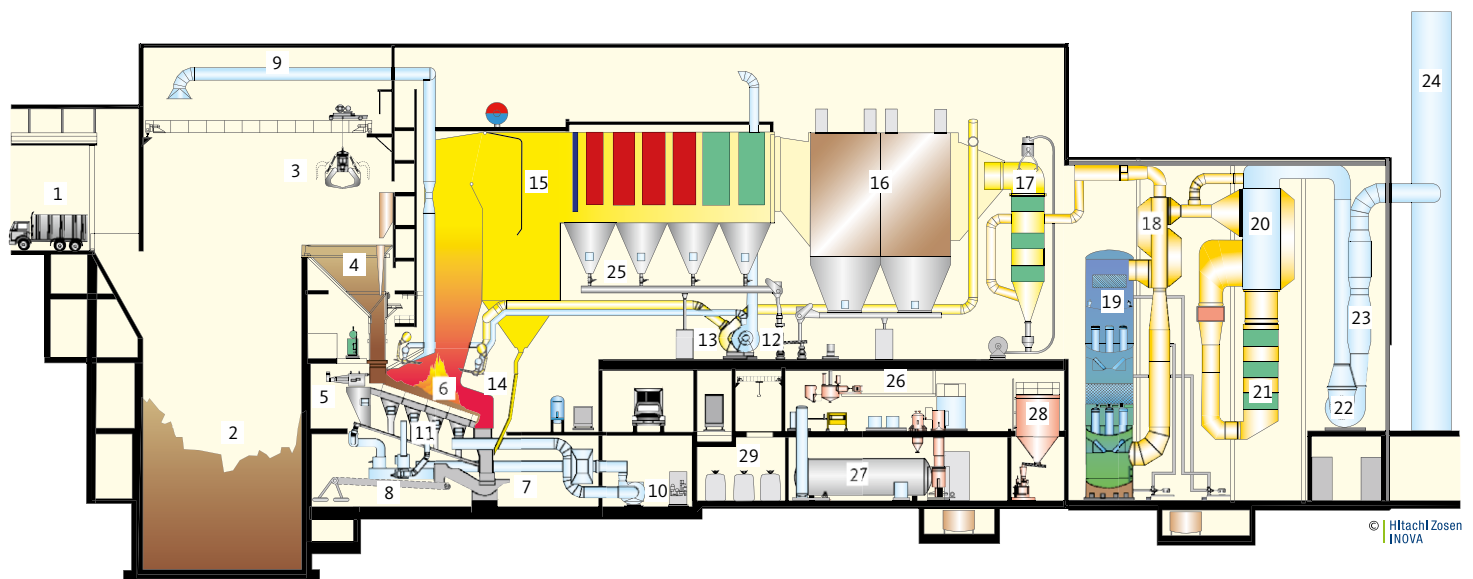
150 communities in the Canton of Vaud, arrive at the plant via a 4-km long rail tunnel beneath the city.

| Optimized Combustion and Low Emissions

The waste is conveyed from the dumping pit through the feed hopper and into the two combustion chambers, each equipped with a HZI Grate. The grates consist of four individually controlled zones. The first two are water-cooled to ensure consistent and optimal burnout of the wastes at over 1,000 °C. Each of the two four-pass horizontal boilers features a secondary combustion chamber, which guarantees maximal flue gas burnout, two additional radiation passes, and a horizontal convection zone.

Downstream of the electrostatic precipitators, an external economizer optimizes the energy recovery.

In the second stage, the flue gases are treated in a three-stage wet scrubber and then denitrified in the catalyst. A gas/gas heat exchanger upstream of both stages aids in heat recovery. This plant design meets Switzerland's tough flue gas treatment without difficulty, and most emission levels are in fact just a fraction of the mandated limits.



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Waste Receiving and Storage

- 1 Delivery hall
- 2 Waste pit
- 3 Waste crane

Grate Combustion and Boiler

- 4 Feed hopper
- 5 Ram feeder
- 6 HZI Grate
- 7 Bottom ash conveyor
- 8 Bottom ash conveyor belt
- 9 Primary air intake
- 10 Primary air fan
- 11 Primary air distribution
- 12 Secondary air fan
- 13 Recirculation fan
- 14 Secondary air injection
- 15 Four-pass boiler

Flue Gas Treatment

- 16 Electrostatic precipitator
- 17 External economiser
- 18 Gas/gas heat exchanger 1
- 19 Wet scrubber
- 20 Gas/gas heat exchanger 2
- 21 SCR catalyst
- 22 Induced draft fan
- 23 Silencer
- 24 Stack

Residue Treatment

- 25 Ash removal
- 26 Acid fly ash washing
- 27 Collection tank scrubber blow down
- 28 Lime milk preparation
- 29 Zinc filter cake storageer

Rain Supplies Fresh Water

The wet scrubber at Lausanne is the first in a Hitachi Zosen Inova plant to use rainwater as a utility. The environmentally conscious design collects 6,000 m³ of water annually, i.e. water that does not have to be taken from the public mains and softened. The innovation is not only ecologically beneficial but will actually pay for itself over the plant's lifetime.

Maximized Energy and Recovery of Reusable Substances

Designed for maximal energy efficiency and minimal emissions, the plant produces 82,000 MWh of electrical energy and 247,000 MWh of heat per year. Its output supplies 18,000 households with electricity and heat. What is more, some 1,700 kg of mercury and 180 metric tons of zinc per year are recovered in Lausanne through fly ash washing and then recycled.

General Project Data

Owner	TRIDEL SA
Start of operation	2006
Total investment	CHF 360 million
Scope of HZI	Combustion, flue gas treatment, residue treatment
Plant design	Hitachi Zosen Inova AG

Technical Data

Annual capacity	160,000 t/a
Number of lines	2
Throughput per line	10 t/h (nom.), 12.5 t/h (max.)
Calorific value of waste	14.4 MJ/kg (nom.), 7.2–18.0 MJ/kg (min./max.)
Thermal capacity per line	40 MW
Waste type	Municipal solid and commercial waste
Special waste fractions	Hospital waste, sewage sludge

Waste Delivery

Waste pit capacity	10,000 m ³
Bulk waste shredding	Shredder

Combustion System

Grate type	HZI Grate
Grate design	2 rows with 4 zones per row
Grate size	Length: 8.5 m, width: 5.2 m
Grate cooling	First two zones water-cooled (Aquaroll®)

Boiler

Type	Four-pass boiler, horizontal with external economiser
Steam quantity per line	48.3 t/h
Steam pressure	50 bar
Steam temperature	400 °C
Flue gas outlet temperature	160 °C (end of operations campaign) after external economiser

Flue Gas Treatment

Concept	Electrostatic precipitator, wet scrubber, SCR, wastewater treatment
Flue gas volume per line	63,000 m ³ /h (at standard conditions)

Energy Recovery

Type	Extraction condensation turbine
Electric power output	20 MW (max. generator output)
Heat generation	50 MW

Residues

Bottom ash	37,600 t/a (including treated fly ash)
Zinc concentrate	1,400 t/a from fly ash scrubbing

Special Features

Commodity recycling	Acid fly ash washing with metal recovery Recovery of 180 t/a zinc and 1.7 t/a mercury
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