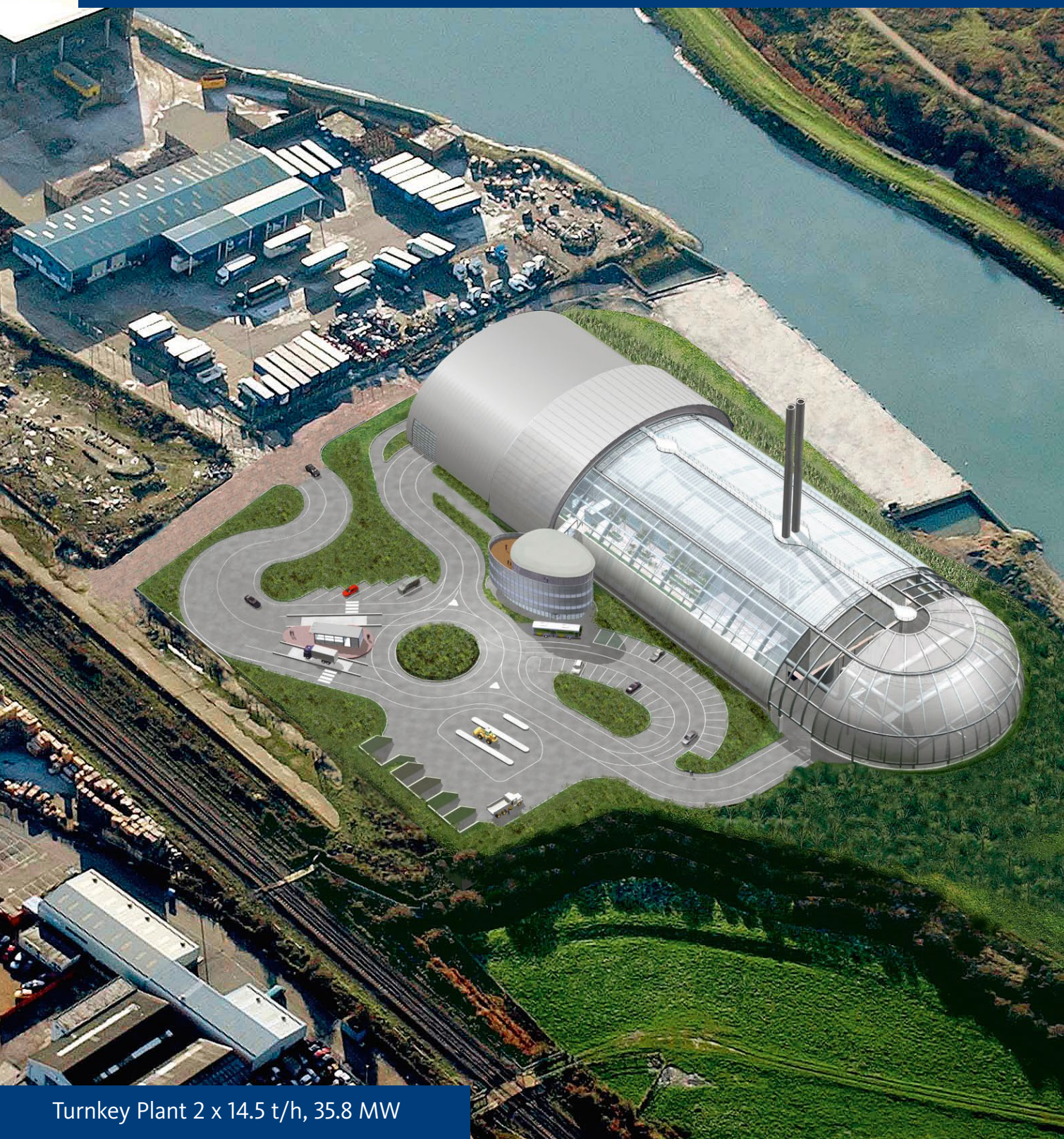


Hitachi Zosen
INOVA

Newhaven / UK
Waste to Energy Plant



Turnkey Plant 2 x 14.5 t/h, 35.8 MW

Newhaven Waste to Energy Facility – an Integrated Waste Management Solution for East Sussex and Brighton & Hove.

With a view to divert residual municipal waste from landfill, the Waste to Energy (WtE) facility at Newhaven provides a state of the art integrated waste management solution for East Sussex County Council and Brighton & Hove City Council in the South East of England. The Waste to Energy plant will be capable of treating up to 210,000 tons a year of domestic waste and in so doing will export enough electricity to power the equivalent of more than 25,000 homes.

Planning for this project was achieved by the owner and operator, Veolia ES South Downs Ltd., a subsidiary of Veolia Environmental Services. Von Roll Inova, today's Hitachi Zosen Inova AG (HZI), has assumed the role of leader in a consortium with Hochtief UK and provides the complete electro-mechanical part of the facility. Construction started in 2008 and the facility will be handed-over in 2011.

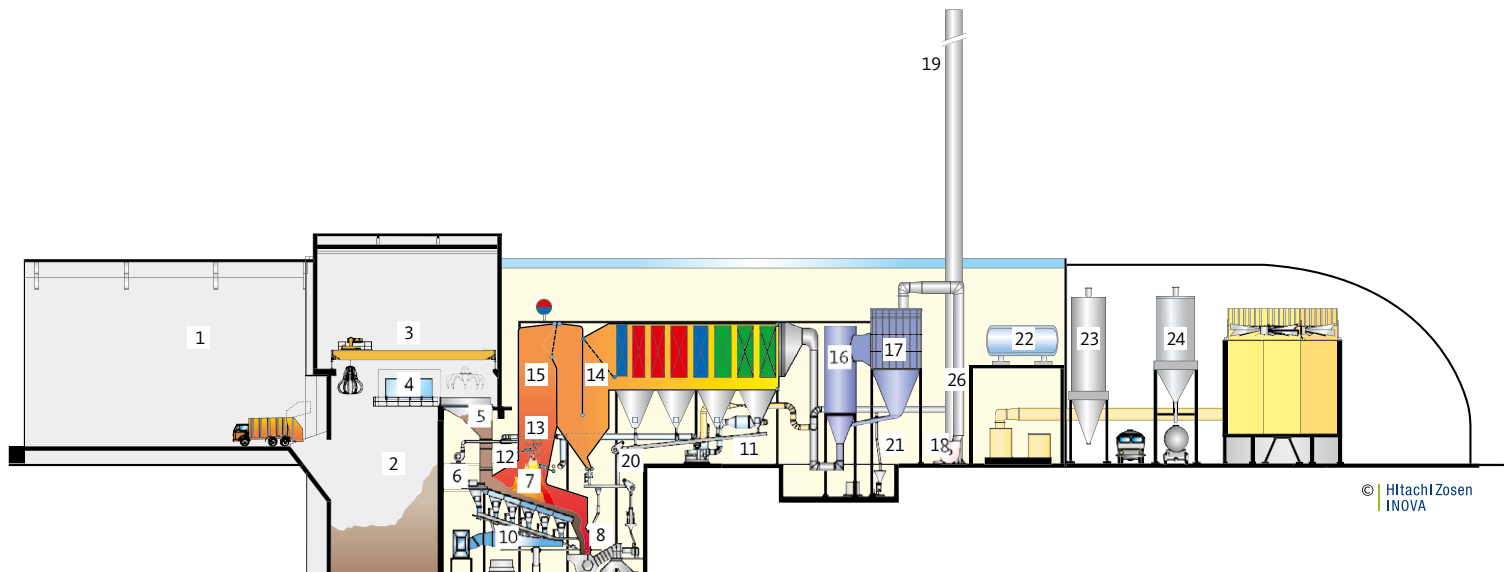
| Modern Architecture Minimises the Visual Impact.

The focus was on creating a high quality innovative proposal that recognises the character and sensitivity of its landscape setting by minimising the visual impact. The location and orientation of the building on the site, the curved profile of the building and the retention of the flood bunds along the river were all taken into consideration. Most of the building will be at a maximum height of 24 m with an arch rising to 27 m. This was achieved by burying major components of the plant below ground.

| The Technical Set-Up for Safe Waste Treatment and Economical Energy Recovery.

The plant has two identical process lines with state of the art technology, each one consisting of combustion system,

boiler and flue gas treatment. It fully complies with the EU Waste Incineration Directive. After kerbside separation of recyclable materials, the residual municipal waste is delivered by collecting vehicles and tipped into the bunker, where it is mixed by the waste crane. The waste is fed by the crane via the feed hopper into the combustion chamber. The reciprocating grate conveys it through the chamber while it is burned without any additional fuels. The preheated combustion air is injected below the grate. The process reduces the waste volume received by up to 90%. The bottom ash passes through the ash discharger onto an ash handling system where ferrous materials are recycled: all within enclosed areas. The remaining inert material is sent for processing and reuse within the construction industry for cover material or for disposal. The secondary air and recirculated flue gas are injected into the hot combustion gases resulting in intensive mixing and complete burnout of the gas. The gas passes through a four-pass water tube boiler where it is cooled while the water of the closed steam condensate cycle is vaporised and superheated. In the first vertical pass, the NO_x reduction is provided by the Selective Non-Catalytic Reduction (SNCR) system using injected aqueous ammonia as the reducing agent.



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Waste Receiving and Storage

- 1 Delivery hall
- 2 Waste pit
- 3 Waste crane
- 4 Crane control cabin

Combustion and Boiler

- 5 Feed hopper
- 6 Ram feeder
- 7 HZI Grate
- 8 Bottom ash
discharger
- 9 Bottom ash conveyor

- 10 Primary air
distribution
- 11 Secondary air/
flue gas
recirculation fan
- 12 Secondary air/
flue gas recirculation-
injection
- 13 Start-up burner
- 14 Four-pass boiler

Flue Gas Treatment

- 15 SNCR injection levels
- 16 Semi-dry reactor
- 17 Fabric filter
- 18 Induced draft fan
- 19 Stack

Residue Handling and Treatment

- 20 Ash conveying system
- 21 Residue conveying
system
- 22 Feed water tank
- 23 Hydrated lime silo
- 24 Residue silo

After leaving the horizontal last pass of the boiler, further flue gas cleaning takes place in the semi-dry flue gas treatment system consisting of a reactor in combination with a fabric filter. This well proven technology removes the acidic pollutants by absorption on hydrated lime and heavy metals and organic pollutants (dioxins/furans) by adsorption on activated carbon. The small particles are removed in the fabric filter. The residues resulting from the flue gas treatment are then sent for safe disposal by an appropriate facility. The cleaned flue gas is finally released into the atmosphere through the twin stack. The whole process is under continuous

control to ensure optimum combustion, low emissions, overall efficiency, and improved quality of the residual materials.

Turning Waste into a Resource.

The superheated steam is expanded in the steam condensing turbine. The produced electricity is fed into the national grid after plant service power is drawn. The Newhaven WtE facility is designed to export around 16.5 megawatts of electricity, which is equivalent to powering more than 25,000 homes.

General Project Data

Owner and operator	Veolia ES South Downs Ltd.
Start of operation	2011
Total investment	EUR 260 Millionen
Scope of HZI	General contractor in consortium with Hochtief UK for civil works
Plant design	Hitachi Zosen Inova AG

Technical Data

Annual capacity	226,000 t/a
Number of trains	2
Throughput per train	14.5 t/h (nom.)
Calorific value of waste	7.0 MJ/kg (min.)–12.5 MJ/kg (max.)
Thermal capacity per train	35.85 MW
Waste type	Municipal solid waste, clinical waste
Special waste fractions	Clinical waste max. 10 %

Combustion System

Grate type	HZI Grate
Grate design	2 rows with 5 zones per row
Grate size	Length: 10.26 m, width: 4.8 m
Grate cooling	Air-cooled

Boiler

Type	Four-pass boiler, horizontal
Steam quantity per train	43.5 t/h
Steam pressure	50 bar
Steam temperature	400 °C
Flue gas outlet temperature	190 °C

Flue Gas Treatment

Concept	SNCR, semi-dry system
Flue gas volume per train	68,000 m³/h

Energy Recovery

Type	Extraction-condensation turbine
Electric power output	19.25 MW

Residue Treatment

Concept	Metal separation
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Residues

Bottom ash	55,725 t/a
Flue gas treatment	3,350 t/a