

Hitachi Zosen INOVA

Newhaven / UK
Energy-from-Waste Plant



Turnkey Plant 2 x 14.5 t/h, 35.8 MW

Newhaven energy recovery facility – an integrated waste management solution for East Sussex and Brighton & Hove.

With a view to divert residual municipal waste from landfill, the energy recovery 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 energy-from-waste 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, 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.

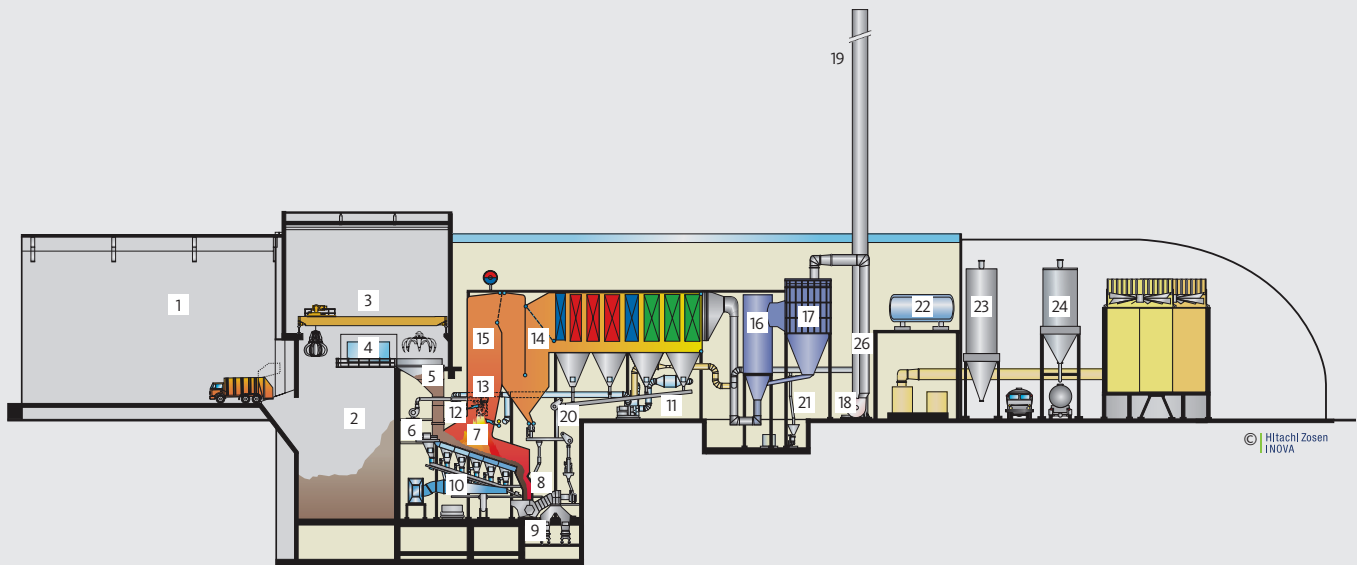
The focus was on creating a high quality innovative proposal that recognises the character and sensitivity of its landscape setting by minimising the visual impact. The location and orientation of the building on the site, the curved profile of the building and the retention of the flood bunds along 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 4-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	Combustion and Boiler	Flue Gas Treatment	Residue Handling and Treatment
1 Tipping hall	5 Feed hopper	15 SNCR injection levels	20 Ash conveying system
2 Waste pit	6 Ram feeder	16 Semi-dry reactor	21 Residue conveying system
3 Waste crane	7 Hitachi Zosen Inova grate	17 Fabric filter	22 Feed water tank
4 Crane control cabin	8 Bottom ash discharger	18 Induced draft fan	23 Hydrated lime silo
	9 Bottom ash conveyor	19 Stack	24 Residue silo
	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		

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 Energy Recovery Facility is designed to export around 16.5 megawatts of electricity, which is equivalent to powering more than 25,000 homes.

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General project data	Owner and operator	Veolia ES South Downs Ltd
	Start of operation	2011
	Total investment	EUR 260 million
	Scope of Hitachi Zosen Inova AG	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	Hitachi Zosen Inova 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 m ³ /h
Energy recovery	Type	Extraction-condensation turbine
	Electric power output	19.25 MW
Residue treatment	Concept	Metal separation
Residues	Bottom ash	55,725 t/a
	Flue gas treatment	3,350 t/a