Hitachi Zosen
INOVA

Newhurst / UK
Waste to Energy Plant

43.34 t/h, 42 MW

Newhurst Waste to Energy Plant – on Course for Maximum Energy Efficiency

The plant near Shepshed in the county of Leicestershire is docked like a ship against the M1 motorway and is ideally located from a logistical point of view. Despite being relatively large, its modern design exudes a simple elegance.

The Waste to Energy (WtE) plant will be operational from 2023 onwards, processing some 350,000 tonnes of non-recyclable municipal and commercial waste every year to produce more than 43 MW of electrical energy. Its net electrical efficiency of 31.3% will be among the very best in the world, and it will be able to supply around 80,000 households with electricity.

Hitachi Zosen Inova (HZI) is acting as general contractor for the Newhurst project, supplying the technology and overseeing the construction of the turnkey plant. The client is a consortium comprising waste management companies Covanta and Biffa together with Green Investment Group – market leaders in developing and operating recycling and WtE plants in the UK and worldwide.

After the plant is commissioned, Covanta will take over its operation and maintenance. The project is HZI's twelfth in the UK and, following Dublin (Ireland) and Rookery South (England), its third in collaboration with Covanta.

Actively Contributing to Sustainable Waste Management

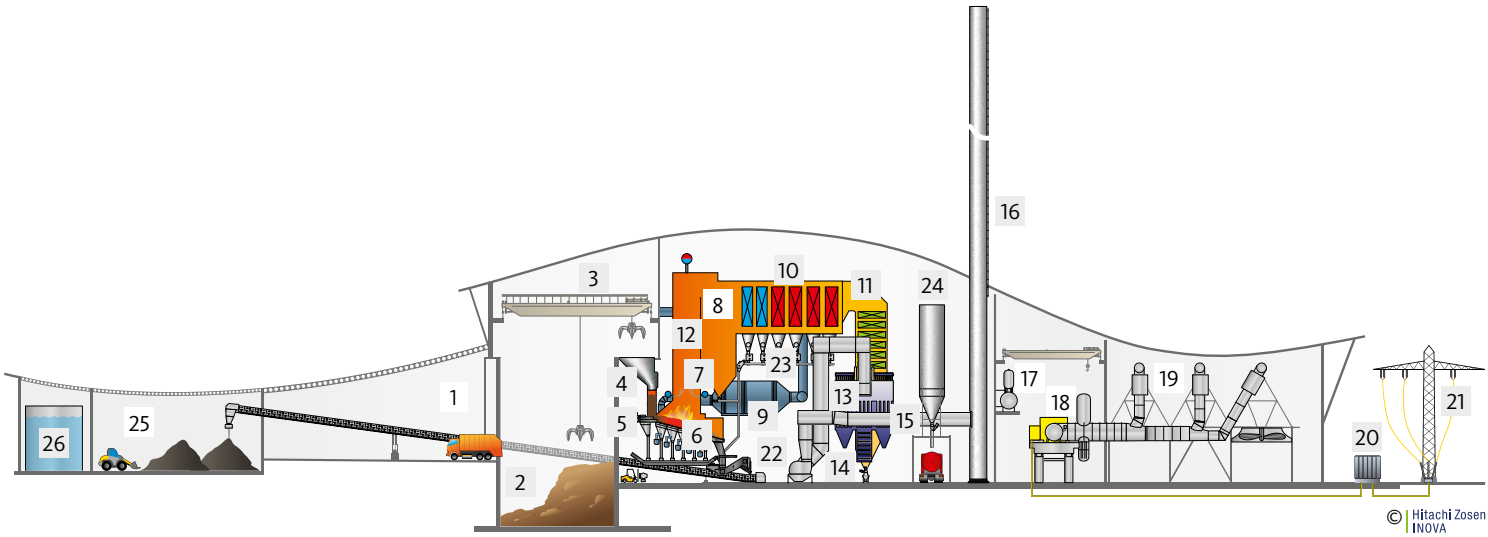
The Newhurst WtE plant will make a substantial contribution to the UK's waste management infrastructure. It will support both the government's efforts to reduce dependency on landfill and the UK's ability to process non-recyclable waste sustainably without having to export it to other European countries.

WtE plants are a safe and advanced waste management solution with a key role to play in the circular economy. They cut CO_2 emissions by reducing the proportion of fossil fuels used in power generation. Incineration also prevents methane emissions that arise from biogenic waste placed in landfill and are harmful to the environment. The metals contained in the waste will be recycled and refined, and the mineral component of the bottom ash can be processed and reused, for example in roadbuilding.

Bespoke Design for Maximum Energy Efficiency

The Newhurst WtE plant is tailored to the client's needs in every respect. It will employ state-of-the-art technology, including the very latest iteration of HZI's air-cooled reciprocating grate. It has been designed as the largest single-line facility built by HZI to date with a view to optimising capital expenditure and operating costs.

To operate the plant, HZI will employ its enhanced combustion control system (CCS+). This will adjust combustion in line with the composition of the waste fed in and optimise burnout, ensuring that the reduction of oxides of nitrogen meets the highest quality standards even in the combustion phase. In combination with XeroSorp dry sorption flue gas treatment, this will mean that emissions not only comply with the legal limits but in fact fall below them. Installing XeroSorp will benefit the plant operator on more than one level. The size and design of the flue gas



Waste Delivery and Storage

1 Delivery hall
2 Waste bunker
3 Waste crane

Combustion and Boiler

4 Feed hopper
5 Ram feeder
6 HZI Grate
7 Secondary air
8 Four-pass boiler
9 Primary air
10 Superheater
11 Economiser

Flue Gas Treatment

12 SNCR DyNOR®
13 Fabric filter
14 Induced draught fan
15 Flue gas duct
16 Stack

Energy Recovery

17 Feed water tank
18 Steam turbine
19 Air cooled condenser
20 Transformer
21 Electrical power distribution

Residue Handling and Treatment

22 Bottom ash extractor
23 Boiler ash discharge
24 Residue silos
25 Bottom ash area
26 Fire water tank

treatment system are geared to enhancing energy efficiency. In addition, the dry cleaning process does not require any extra water input and has a positive impact on water use.

Opening up New Opportunities for the Local Community

Biffa, Covanta and Green Investment Group see themselves as part of the local community, and their engagement is aimed at improving its environment. The construction of the WtE plant in Newhurst is creating jobs and infrastructure for the long term. A local liaison committee set up when construction began serves as an important communication forum, allowing the population to enter into dialogue with neighbours and operators at any time.

General Project Data

Owner and operator	Covanta/Biffa/GIG
Commissioning	2023
Services provided by Hitachi Zosen Inova	General contractor for the turnkey plant, including construction work
Plant design	Hitachi Zosen Inova

Technical Data

Annual capacity (nominal)	350,000 t/a
Number of lines	1
Maximum throughput per line	50.93 t/h
Heat value of waste	9 MJ/kg (min.), 14 MJ/kg (max.)
Thermal output per line	126.4 MW_{th}
Waste type	Mixed household and commercial waste

Combustion

Grate type	HZI's air-cooled reciprocating grate
Grate design	5 rows with 5 zones per row
Grate size	Width: 15 m; length: 10.5 m
Grate cooling	Air-cooled

Boiler

Type	Five-pass boiler
Live steam mass flow rate per line	157 t/h
Live steam pressure	80 bar
Live steam temperature	450 °C

Flue Gas Treatment

Concept	Dry sorption reactor, fabric filter, SNCR
Flue gas volume per line	239,250 m^3/h (STP)

Energy Recovery

Type	Extraction condensing turbine
Gross electrical output	43 MW_{el} at 100%

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