

Hitachi Zosen
INOVA

Dublin / Ireland
Waste to Energy Plant



2 x 32 t/h, 68 MW

Green Energy and Sustainability for Top Energy Efficiency.

Following Oslo, Paris, Edinburgh, and London, Hitachi Zosen Inova (HZI) is implementing its technology in a further European capital – in Dublin’s new Waste to Energy (WtE) Plant. The installation will supply electricity to more than 80,000 households at the highest levels of energy efficiency.

The project in Dublin is a public-private partnership between the City of Dublin (on behalf of the four local municipal authorities) and the recycling and energy company Covanta. Besides minimising landfill and generally reducing the volume of waste, the regional Dublin Waste Management Plan contained plans to build an Energy to Waste Plant for the thermal treatment of nonrecyclable municipal solid waste. The technology was supplied by HZI. This is the first joint WtE project of Covanta and HZI.

The project received initial planning approval in November 2007 from An Bord Pleanála, the local building and infrastructure authority. A year later the project was granted a waste license by the Environmental Protection Agency, and in September 2009 it received authorizations from the Commission for Energy Regulation, before the last remaining approvals were granted for construction work to commence in summer of 2014.

After various previous attempts over the years to build WtE plants in Ireland had failed, the construction of the Dublin installation marked new milestones in various respects: As well as being HZI’s first project in Ireland, the capital’s WtE plant is also among the first of its kind in the country. The installation’s two combustion lines will thermally process up to 600,000 tonnes of municipal waste per year to generate up to 68.8 MW of electricity, enough for the daily use of around 80,000 homes.

| **Harnessing Advantages of the Site for Top Efficiency**

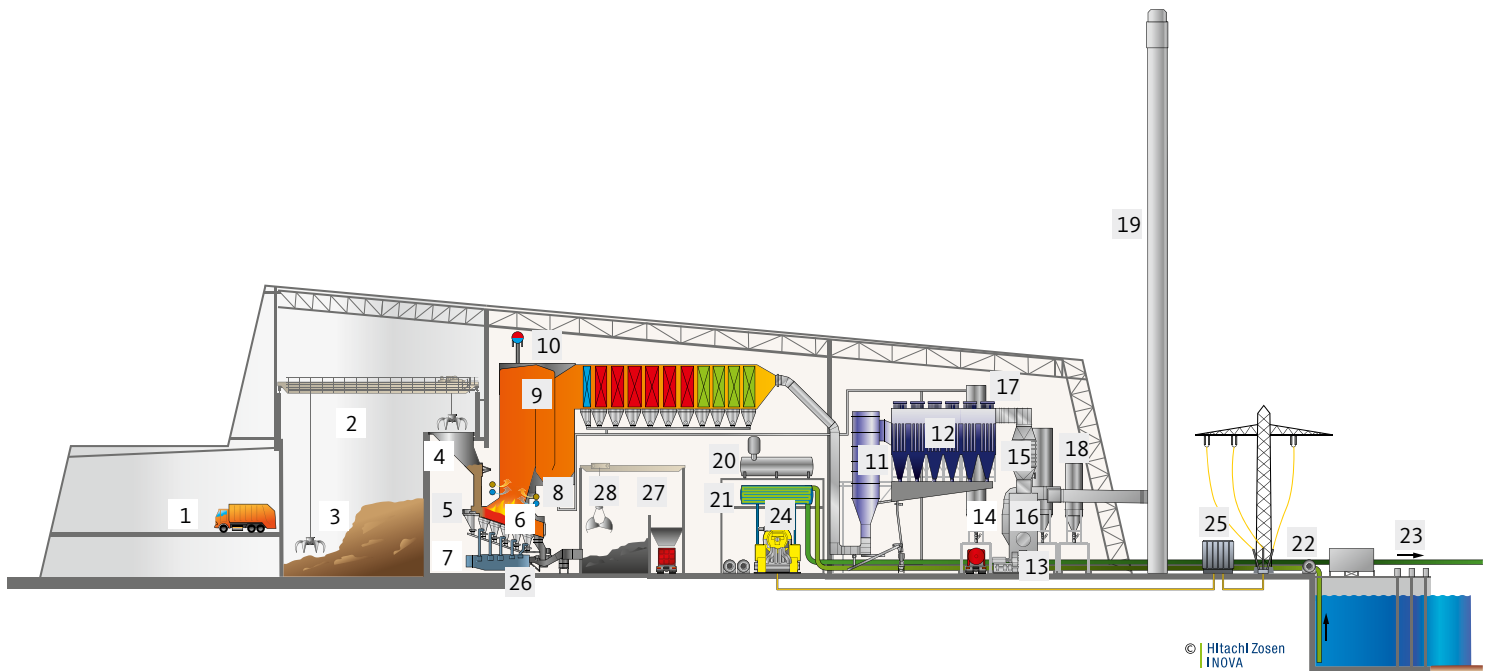
The facility was built on the Poolbeg peninsula, in Dublin’s port area. The site has various advantages: Direct access to the sea enables considerable savings for the water condenser without any impact for the sea life. Moreover, an additional flue gas heat exchanger reheats the condensate, resulting in net plant efficiency of over 30%. This puts Dublin on a par with other HZI installations at the head of the European efficiency rankings.

The WtE plant operates on a completely wastewater-free basis. Most of the feed water comes from its own rainwater treatment system or the neighboring water treatment plant.

Not only this, but thanks to the HZI DyNOR® SNCR from HZI, the lime-based HZI SemiDry flue gas purification system, and a wet scrubber, the facility achieves emissions that are well below the WID standard, meet the most stringent environmental requirements, and are constantly monitored.

| **Reliable Processes Thanks to First-Class Technology**

Municipal and commercial waste that cannot be reused or recycled is delivered by truck and unloaded into the waste bunker from where it is put into the feed hopper by crane and then taken onto the reciprocating grate, the heart of HZI’s combustion technology.



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Waste Receiving and Storage

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

Combustion and Boiler

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

Flue Gas Treatment

- 11 SemiDry reactor
- 12 Fabric filter
- 13 Induced draught fan
- 14 Silencer
- 15 Flue gas heat exchanger
- 16 Wet scrubber
- 17 Residue silo
- 18 Additive silos
- 19 Stack

Energy Recovery

- 20 Feed water tank
- 21 Water cooled condenser
- 22 Cooling water pump
- 23 Fish screen and return system/ water intake filter
- 24 Turbine
- 25 Transformer

Residue Handling and Treatment

- 26 Bottom ash extractor
- 27 Bottom ash bunker
- 28 Bottom ash crane

Temperatures of more than 1,000 °C and primary and secondary air injection assure optimum combustion. The resulting thermal energy heats water to produce steam that is directed onto a turbine, linked to a generator that produces electrical energy. Exhaust steam from the turbine is condensed in the steam condenser, with the requisite cooling water pumped directly from the sea. For conservation reasons the Dublin facility has a fish screen around the water intake to prevent marine animals from entering the cooling system.

Ash from the combustion process is collected below the grate and transported away via ship. Once recyclable residues such as ferrous and nonferrous metals have been separated out, the rest is re-used as construction material.

The flue gas treatment system makes up around one-third of the Poolbeg facility. The flue gas is treated in three stages until it is pure enough to be released from the stack at the lowest possible emission levels. In stage 1 the flue gas is fed into the SemiDry reactor at a temperature of around 170 °C and injected with dry hydrated lime, water and activated carbon. The particles of calcium hydroxide react with the pollutants in the flue gas to create particulate matter that is removed in the second stage, the fabric filter, whereas the activated carbon neutralises any traces of mercury, and dioxine/furan. In the third and final stage, the wet scrubber absorbs and neutralizes any remaining acid gas.

General Project Data

Owner and operator	Covanta Europe Engineering Ltd.
Start of operation	2017
Scope of HZI	Turnkey without civil: combustion, boiler, fluegas treatment, water steam cycle with turbine, distributed control system, supporting systems, EIC
Design	Hitachi Zosen Inova

Technical Data

Annual capacity	600,000 t/a
Number of lines	2
Throughput per line	32 t/h nom.
Calorific value of waste	11,500 kJ/kg
Thermal capacity per line	102.5 MW
Waste type	Municipal solid waste

Combustion System

Grate type	HZI Grate R-100120
Grate design	Four grate lanes with five zones per lane
Grate size	Length: 10.25 m, width: 12 m
Grate cooling	Air-cooled

Boiler

Type	Four-pass boiler, horizontal
Steam flow per line	125 t/h
Steam pressure	62.0 bar (a)
Flue gas outlet temperature	190 °C

Flue Gas Treatment

Concept	SNCR, fabric filter, scrubber, HZI SemiDry
Flue gas volume per line	139,403 Nm ³ /h

Energy Recovery

Type	Extraction-condensation turbine
Electric power output	68.8 MW max.