

Delfzijl



Energetic

Waste is a valuable source of energy. The energy from waste has been recycled in the plants of the EEW-Energy-from-Waste Group (EEW) for more than 40 years now and used to generate environmentally friendly power, district heating and process steam.

At the same time thermal waste recycling is a supporting pillar of a modern, sustainable waste-disposal economy. EEW guarantees this to its partners and customers.

For this reason EEW develops, constructs and runs waste-incineration plants of a high technical and ecological standard and thereby makes an important contribution to the environment and to climate protection.

At one with nature

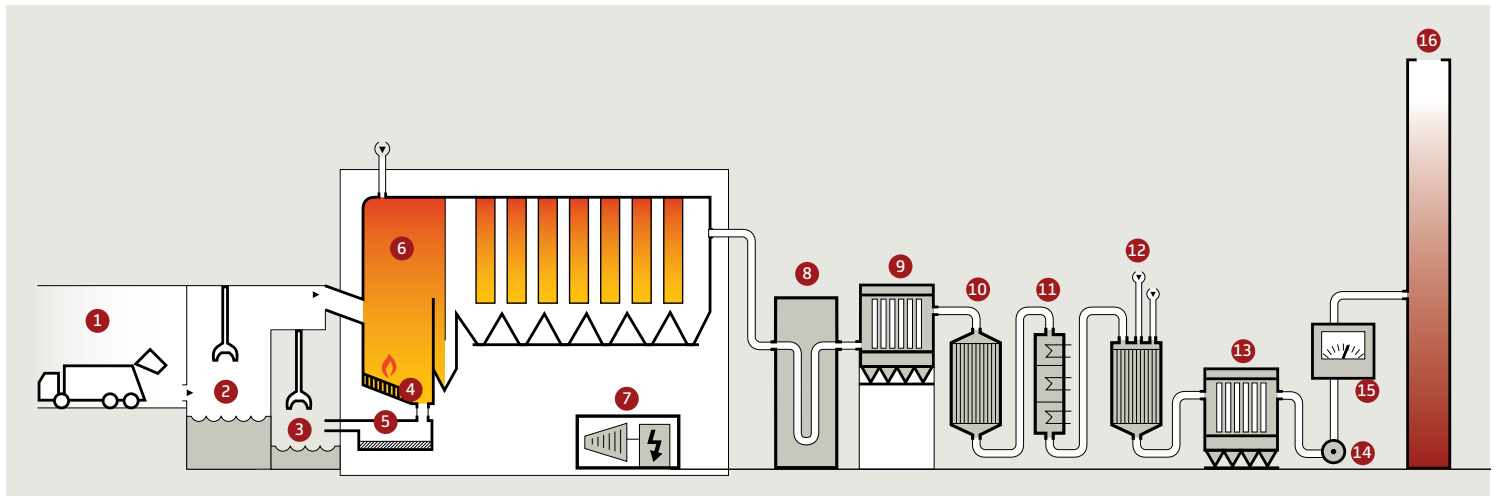
In close proximity to the Wattenmeer nature park, EEW Energy from Waste Delfzijl is operating a thermal waste recycling plant for recycled commercial and household waste as well as replacement fuels. The location in Delfzijl's Oosterhorn industrial park in the Dutch province of Groningen offers EEW Delfzijl several benefits. On the one hand the location can use the existing infrastructure - the waste can be delivered by ship, rail or truck - and on the other the supply routes for process steam to neighbouring industrial plants are particularly short. Industrial partners are therefore able to procure cheap, reliable and environmentally friendly energy directly from Delfzijl.

Replacement fuels are a specially recycled form of commercial and industrial waste which have a significantly higher heat range than traditional household waste.

The plant went into operation in 2010 with two incineration lines. It can thermally recycle up to 384,000 tons of waste per year.



Everything at a glance



- | | |
|---------------------------|-------------------------------|
| 1 Covered Delivery | 10 Catalytic Converter |
| 2 Waste Bunker | 11 Flue Gas Heat Exchanger |
| 3 Slag Bunker | 12 Entrained Flow Reactor |
| 4 Incineration Grates | lime hydrate/activated carbon |
| 5 Wet Deasher | 13 Bag Filter 2 |
| 6 Furnace | 14 Flue Gas Ventilator |
| 7 Steam Turbine/Generator | 15 Emission Measurements |
| 8 Flue Gas Cleansing | 16 Chimney |
| Bicarbonate Reactor | |
| 9 Bag Filter 1 | |

Supplementary Data

Put into operation	2010
Total investments	160 million euros
Capacity	384,000 tons/year
No. of incineration lines	2
Waste storage volume	15,000 cubic metres \approx 10,000 tons
Heat Range for the Waste	8-18 megajoules/kilogram
Combustion Temperature	$> 850^{\circ}\text{C}$
Steam production	550,000 megawatt hours per year
Power production	120,000 megawatt hours per year \approx 24,000 households

Residual waste turns into energy

Mondays to Fridays waste is brought to the EEW Delfzijl plant where it is collected and put into interim storage in the waste bunker. Up to 10,000 tons of this “fuel” can be stored in the bunker. This corresponds to the loads of around 2,500 garbage vehicles. This ensures that operation is continuous even at the weekend or on official holidays.

An employee stirs the waste with the help of a crane claw to create a homogeneous mix. The different proportions of waste from household, commercial and industrial waste as well as replacement fuels have different calorific values. Only by continuously stirring the waste can even incineration be ensured.

Both lines can burn fuel with a heat value of 8,000 to 16,000 kilojoules per kilogram. But the plant aims for an average value of 11,500 kilojoules per kilogram. The fuel is moved using a crane claw which can hold up to five tons.

To ensure that no smells can escape into the air a slight underpressure is maintained in the bunker.

This is created by suctioning air from the bunker for purposes of combustion.



The prepared waste is transferred from the bunker via the feeding hopper to the incineration grates of the two lines. Once ignited the waste material automatically continues to burn. The fire has a temperature of more than 850 °C. With this heat energy in the two furnaces around 140 tons of steam per hour are produced. With a pressure of 40 bar and a temperature of 400 °C this steam drives a turbine connected to a generator. In this way the plant can produce electricity and at the same time supply process steam to industrial partners at different pressure stages.

The operation of the plant represents an alternative to an annual energy production based on the use of around 80 million cubic litres of natural gas.

Environment protection right from the start

Environmental protection is already applied at the furnace-burning stage. Pollutants contained in the waste, such as dioxin and furans, must be fully destroyed. This is ensured by a minimum temperature of 850 °C. At the same time the levels of carbon monoxide and nitrogen oxide are reduced.

With a temperature of 230 °C the flue gases leave the furnace and then undergo five further stages of flue-gas cleansing during which other pollutants are reduced to a minimum.

The first step is for bicarbonate to be injected into the flue gas in order to bind the acidic components such as sulphuric acid or hydrochloric acid as salts. The solids thus formed are deposited together with the flue ash on the hoses of the connected bag filter and there they form an absorbent layer. The deposits are removed at regular intervals by means of jets of compressed air.

No chance for pollutants

The flue gases then flow through the catalytic converter where the nitrogen oxides are converted to harmless nitrogen and water by means of ammonia water. An interposed economiser cools the flue gas down to 140 °C and uses this heat energy to pre-heat the water for the furnace.

Next comes the entrained flow reactor where any newly formed dioxins and furans as well as other organic components are removed. This is done by finely distributing hydrated lime and activated carbon in the flue gas which bind the pollutants. Lastly a second bag filter cleanses the gas and filters out the remaining dust and solid components. Then the flue gas leaves the plant via the two 70-metre-high chimneys.

What remains is slag, flue ash and filtration dust. The slag is recovered and is used for roads and civil engineering projects. The flue ashes and filtration dust, by contrast, are removed and used as backfilling material.



Strict specifications

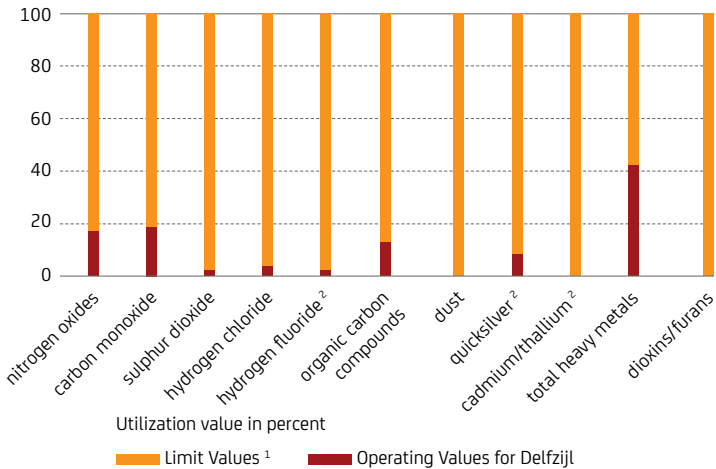
Thermal waste recycling is currently the most environment-friendly form of waste disposal.

By using waste as fuel, emissions of carbon dioxide are reduced in the EEW Delfzijl plant alone by some 160,000 tons a year - as compared to power production in conventional brown coal-fired power plants.

The European Union has specified emission limits for waste incineration in Europe which are among the strictest in the world.

This location is far below these limits. A local supervisory authority continuously monitors the current emission values from EEW Delfzijl. At the same time the location publishes its current values on a board at the main gate in order to meet the need for information.

Emission Data for EEW plant




¹ In accordance with European emission limits.
² Operating values are below the detection limit

Our Environmental Contribution



384,000 tons of waste
per year disposed of cleanly



550,000 megawatt hours
of steam per year



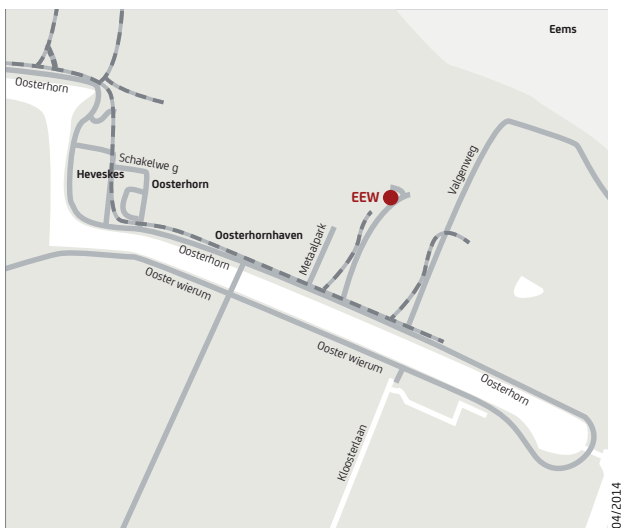
120,000 megawatt hours
of power production per year



Power for
24,000 households



160,000 tons
of CO₂ saved



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Our corporate design
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