

HAFNER
WASTE TO ENERGY



PROVIDING **OPPORTUNITIES** TO COMBAT **CLIMATE** CHANGE

CO₂ dispersion, global warming and the rapid expansion of emerging economies

Worldwide scarcity of energy and volumes of waste increasing exponentially.

Leaders of the global population face the threat of an ever increasing energy thirst but, simultaneously, the responsibility to preserve

Nature's delicate balance.

In waste management, decades of land filling have disseminated countless ecological time bombs throughout each nation.

As previously utilized procedures are unsuccessful in tackling mounting problems, new approaches to resolve these issues and safeguard the environment have become crucial.



[The path towards sensible and economically viable solutions can be taken now, without further delay.



Hafner Waste to Energy plants utilize municipal waste, industrial waste, medical waste or any other kind of waste, converting it into energy through a high temperature combustion process.

A Waste to Energy plant offers a substantial contribution to climate protection by recovering energy, reducing greenhouse gases produced by methane emissions in landfills and, simultaneously, guaranteeing the safe disposal of waste in accordance with each nation's waste management directives.

European Union Directives, designed to significantly reduce dependence on landfill as the main method of disposing waste, have set challenging targets for all European member nations; more than 500 members of the European Parliament support Waste to Energy technology. By virtue of this, Waste to Energy technology is recognized by the European Parliament as a "recovery technology" within the European Union Waste Framework Directive.





HAFNER WASTE TO ENERGY PLANTS



“MISTRAL,, WASTE TO ENERGY PLANT-ITALY





WASTE TO ENERGY

A close-up of a human hand, palm up, holding a large, vibrant flame. The flame is bright orange and yellow, with intricate patterns of fire. The background is dark, making the flame and the hand stand out.

Along with energy conservation and increased energy efficiency, renewable energy is the only effective alternative to depleting, nature-impacting fossil fuels. Each ton of solid waste contains the energy value of approximately one barrel of oil, or 1/4 ton of coal, hence, waste is a resource with a remarkable renewable energy value.

Generating energy from waste instead of sending it to landfill prevents methane emissions (landfill gas), which equal over twenty times CO₂. A Hafner Waste to Energy plant can prevent millions of tons of CO₂ dispersion each year while, at considerable savings, produce precious energy for businesses and communities.

Safe waste management processes which mitigate climate emissions are the primary objective of the Hafner Group. This twofold target is accomplished by innovation in technology, whereby enhanced plant energy efficiency and emission reduction are the constant focus of the Hafner engineering team. Hafner Waste to Energy technology is a forward-looking solution for a faster journey towards combating climate change.





The Waste to Energy system

is designed to dispose of wastes while guaranteeing the lowest emissions possible.

A Hafner facility can function 80/90% of the year,

or approximately 8,000 hours,

having some of the following technological and functional features:

Waste loading

Waste is sent to the incineration area by means of an industrial grab and a continuous dosing conveyor. The waste is poured into the loading hopper and introduced into the furnace through a closing shutter that prevents false air from leaking in (sludge is conveyed into the rotary furnace directly by means of a pump, while liquid waste is pumped at high pressure directly into the incinerator and sprayed by special injector nozzles). The supply systems permit continuous feed to prevent the forming of clogs and / or compact material lumps.

Rotary kiln

Made of carbon steel and fettling, the rotary furnace can be designed to incinerate waste with low and high calorific value. The waste stay time is adjustable by varying the rotation of the rotary drum. In detail, the rotary furnace consists of a very thick metallic cylinder with high alumina content refractory lining and a manual speed reducer. The furnace is inclined by 2° on a horizontal plane while it rotates on four bearing rollers equipped with special bearings. It is also equipped with a number of guns and with a modulating burner (methane, gasoline, liquid waste) for triggering combustion and stabilizing the temperature.

Boiler

The plants are equipped with a Hafner-designed boiler, ranging from 5 to 150 tons, with a pressure of 10 to 110 bar, working at temperatures of up to 450°C. The boilers are built with various membranes (vaporization surfaces) for the production of saturated steam. Depending on the specific plant design, the post combustion chamber is incorporated in the first segment of the boiler.

By flowing through draught tubes, the water reaches the membrane walls where it is transformed from liquid to gas. The resulting saturated steam is conveyed from the steam drum to the superheaters.



“ZAC,, WASTE TO ENERGY PLANT - GERMANY



Steam turbine

The steam turbine is comprised of a high-pressure and a low-pressure segment. Located between the two is an extraction steam valve. Depending on quantity, pressure, and temperature, the main steam activates the turbine wheels and the resulting mechanical power is transmitted to the generator (the generator will then produce electricity which is fed into the grid). Waste exhaust steam reaches the air condenser at 0.15 (a) bar and is subsequently cooled down and directed, as condensate, into the feed water tank.



Post-combustion

This part is dimensioned according to the flow-rate of the fumes coming from the incinerator (to which the secondary combustion air is added). Control burners are positioned in the first quarter of the combustion chamber on the fume entrance side, while the temperature and O₂ gauge is placed in the last quarter of the chamber near the fume exit.



Slag discharge

The post-combustion slag falls onto a water-bed conveyor where they are cooled down and, by means of the conveyor's rotating mechanical scraper, conveyed to a collection bin.

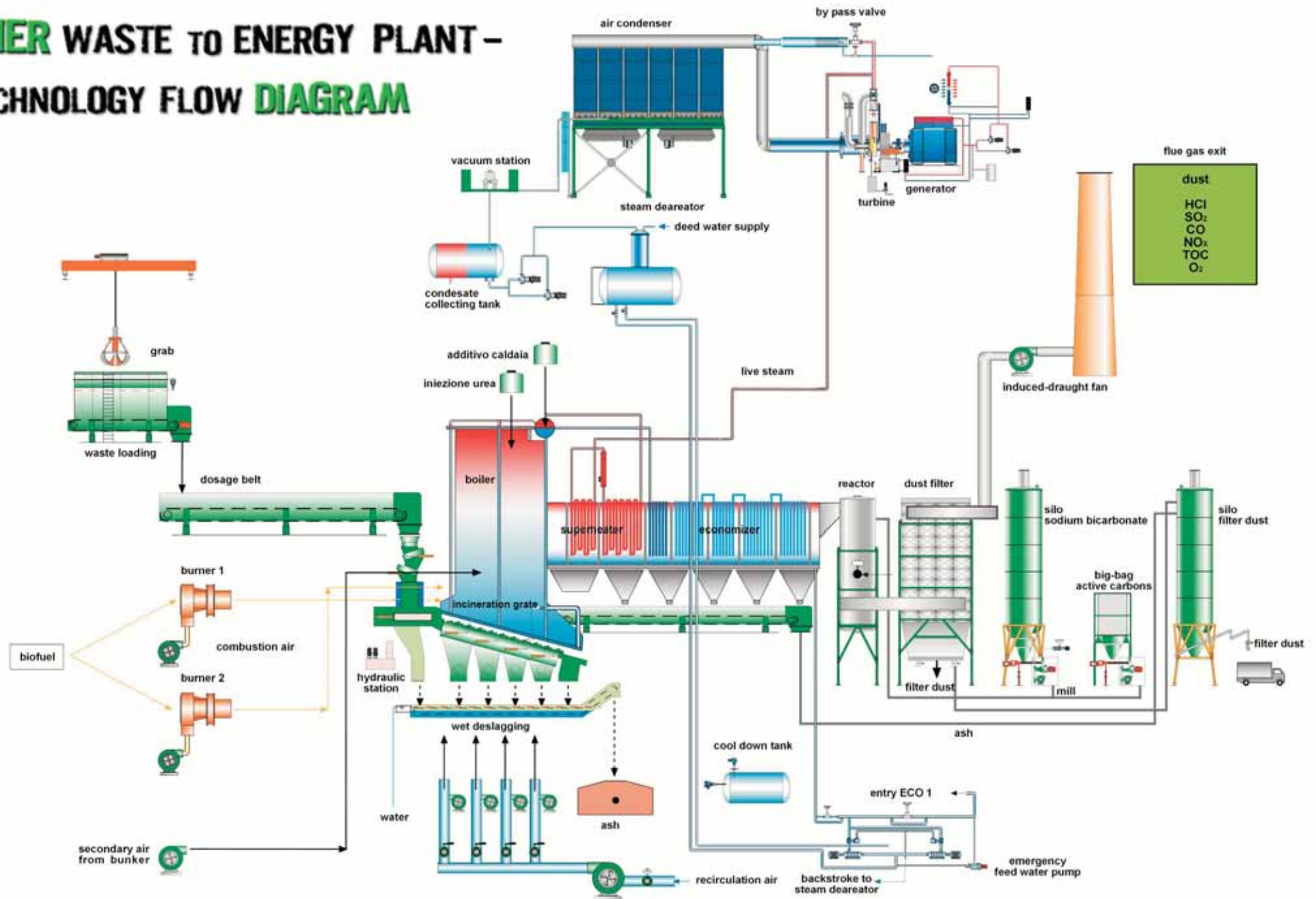


Reactor

Depending on the plant design and emission control objectives, a Hafner Waste to Energy plant can have more than one reactor. The fumes exiting the Boiler, the superheater and the economizer enter the reactor's vertical-cylindrical casing where they are kept for a few seconds so that the sodium bicarbonate/ active carbon reaction can take place. The mixture of sodium bicarbonate (ground to 20 micron) and active carbon is blown through a special pipe. If the high temperature alarm at the sleeve-filter entry gate is activated, a pneumatic flue damper mounted in the cylindrical casing intervenes and opens a flow of tertiary air to prevent the filter sleeves from breaking.



HAFNER WASTE TO ENERGY PLANT - TECHNOLOGY FLOW DIAGRAM



Sleeve filter

The reaction that destroys the pollutants ends in the sleeve filter (mounted downstream from the reactor). The reaction takes place between the sodium bicarbonate and the active carbon that forms in a layer outside the filtering material's bearing structure. Countercurrent washing by means of compressed air at 6-7 bars cleans the tubular filter sleeves. This is done row after row, at adjustable frequencies. The salts, dusts and reagent residues are deposited on the hopper located below the filter and are discharged by an extractor screw equipped with rotocells. A thruster conveys these residues pneumatically to the appropriate residue storage silo. Now cleaned, the fumes are conveyed to the stack and discharged into the atmosphere at about 180° C.



Incineration grate

The grate has 4 parts, it is driven hydraulically via proportional valves, just as it happens in the feeding cylinder. The feeding changes from one grate segment to the other by tuning the cycles.



Boiler Ash removal

Low frequency vibrating hammers are installed in order to clean the superheater and the economizer. The hammers are activated periodically to cleanse the boiler of boiler ash. Located beneath the boiler's bins is a conveyor belt that removes the boiler ash. In addition to the vibrating hammer devices, the economizer is equipped with an ultrasound cleaner. In case of an excessive amount of dust, or an increase in temperature at the bottom of the boiler, along with the hammers, the ultrasound cleaners will also activate. The ultrasound cleaners are operated by a time-set control system, providing periodical cleaning in this part of the boiler.



Stack

The stack is made of stainless steel and insulated with aluminium lining. Every Hafner Waste to Energy plant has controllers whereby a number of parameters are constantly analyzed: CO, CO₂, NO_x, O₂, HCL, SO₂, TOC, dusts, temperature, pressure, and volume flow-rate. The data is transmitted to the PLC installed in the control room where it is processed, compared to 11% ratio of dry oxygen, displayed on the screen and printed daily.





The HAFNER group was established in Bolzano, northern Italy, in 1979 by Mr. Heinrich Hafner, with office subsidiaries in Germany and Austria. For nearly thirty years, Hafner has specialized in Waste to Energy technology design, construction and management. Through safe, field-tested technology, the company know-how enhances the value of waste and biomass by generating thermal and electric energy in full compliance with the requirements of European waste directives. The group provides turn-key solutions for the treatment of municipal waste, special wastes (such as toxic wastes), medical waste, liquid waste, sludge, and biomass.

Its Waste to Energy facilities enable private companies and government institutions to safely dispose of waste in full compliance with current legislation and simultaneously contribute to climate protection. Since its inception, the company has been at the forefront of technological innovation. It was one of the first companies in the world to propose the concept of a “mobile waste to energy plant”, offering an important factor of flexibility to those entities in need of small, mobile plants for managing waste in diverse, remote locations. Hafner is a fully ISO 9000 certified company, with all certifications for the production and operation of Waste to Energy facilities.

Incorporated in the beautiful alpine region of South Tyrol, Hafner ensures a tradition of experience in the field of environmental protection. At its core, the company has always followed the ecological values that have made this European region a famous tourist destination; an innate, sacrosanct respect for nature, widespread and fervent protection of the environment, and strong traditions.



[The Hafner logo, composed of a tree, a rainbow and a butterfly, is a serene composition that highlights this conception **of life and work.**







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