

The Bolzano Waste-To-Energy Plant

A cutting-edge plant



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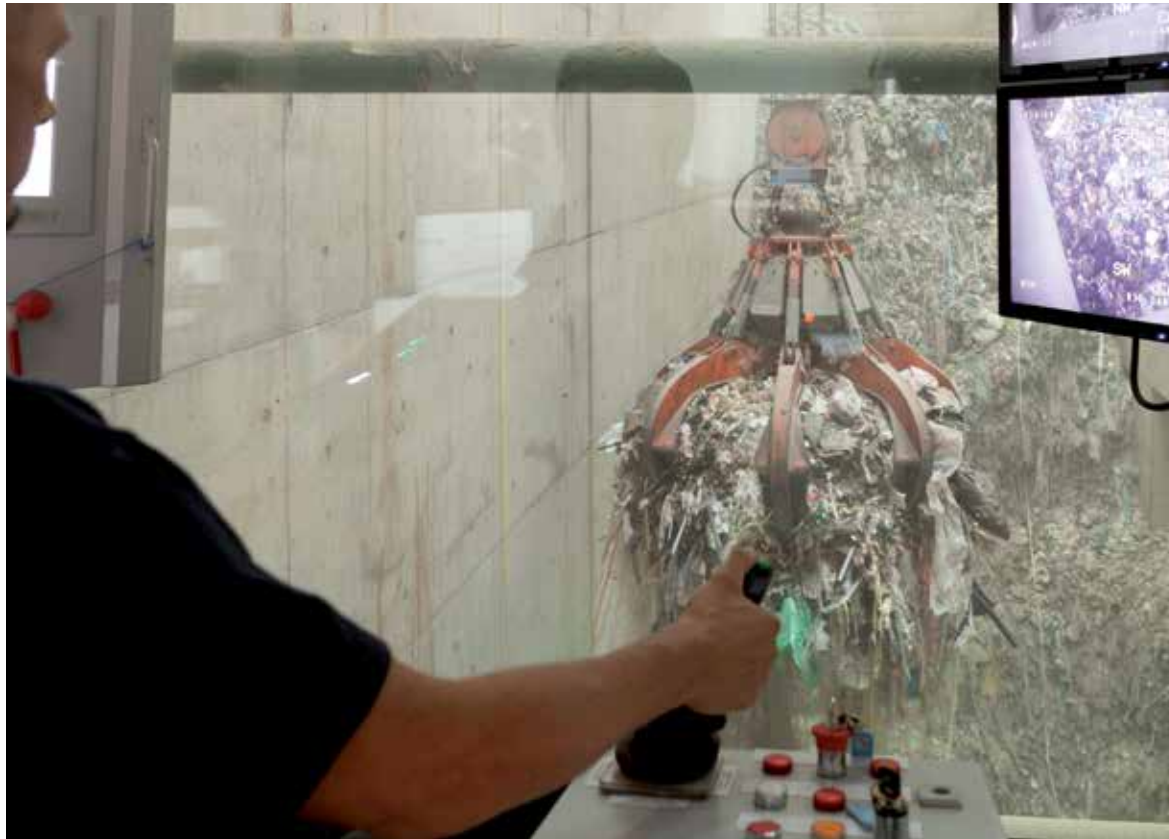


About us

Eco Center S.p.A. is one of the **leading companies in the environment sector in the Province of Bolzano**. It is an entirely public capital, in-house company with over 100 shareholders.

It runs the main **waste disposal plants of the Province of Bolzano and the water supply system that includes the sewers and water purification plants of the ATO2 area**. It promotes **environmental research projects** to study the effects of human activity on the land. It serves 116 municipalities in the waste sector and 58 in the water sector, with a total of 160 employees.

Waste management

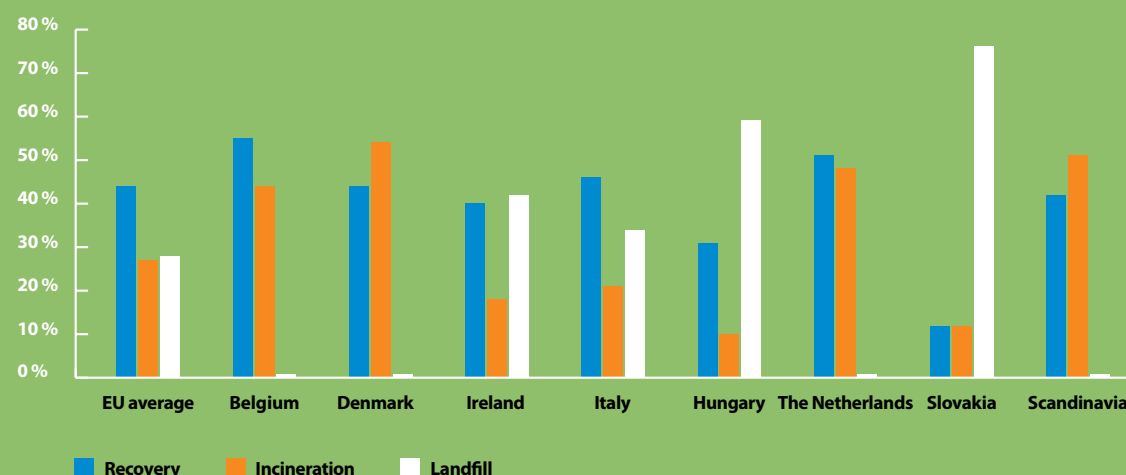


The situation in Europe

In 2014, each European citizen produced 475 kg of urban waste. Of this, 44% has been recovered (recycling and composting), 27% incinerated and 28% landfilled. Italy is above the European average as regards recovery (46%) and landfill disposal

(34%), while it is below the average as regards incineration (21%). In the more industrialised European countries, a high percentage of recovered waste corresponds to a high percentage of incineration and a low percentage of landfilling.

Urban waste in 2014



Source: Eurostat



What about in South Tyrol?

In South Tyrol each year 270,000 tonnes of urban or similar waste is produced. Of this total amount, 52% is recovered, 44% is sent to the waste-to-energy plant and 4% is landfilled. The disposal system is aligned with that present in Europe's more industrialised countries.



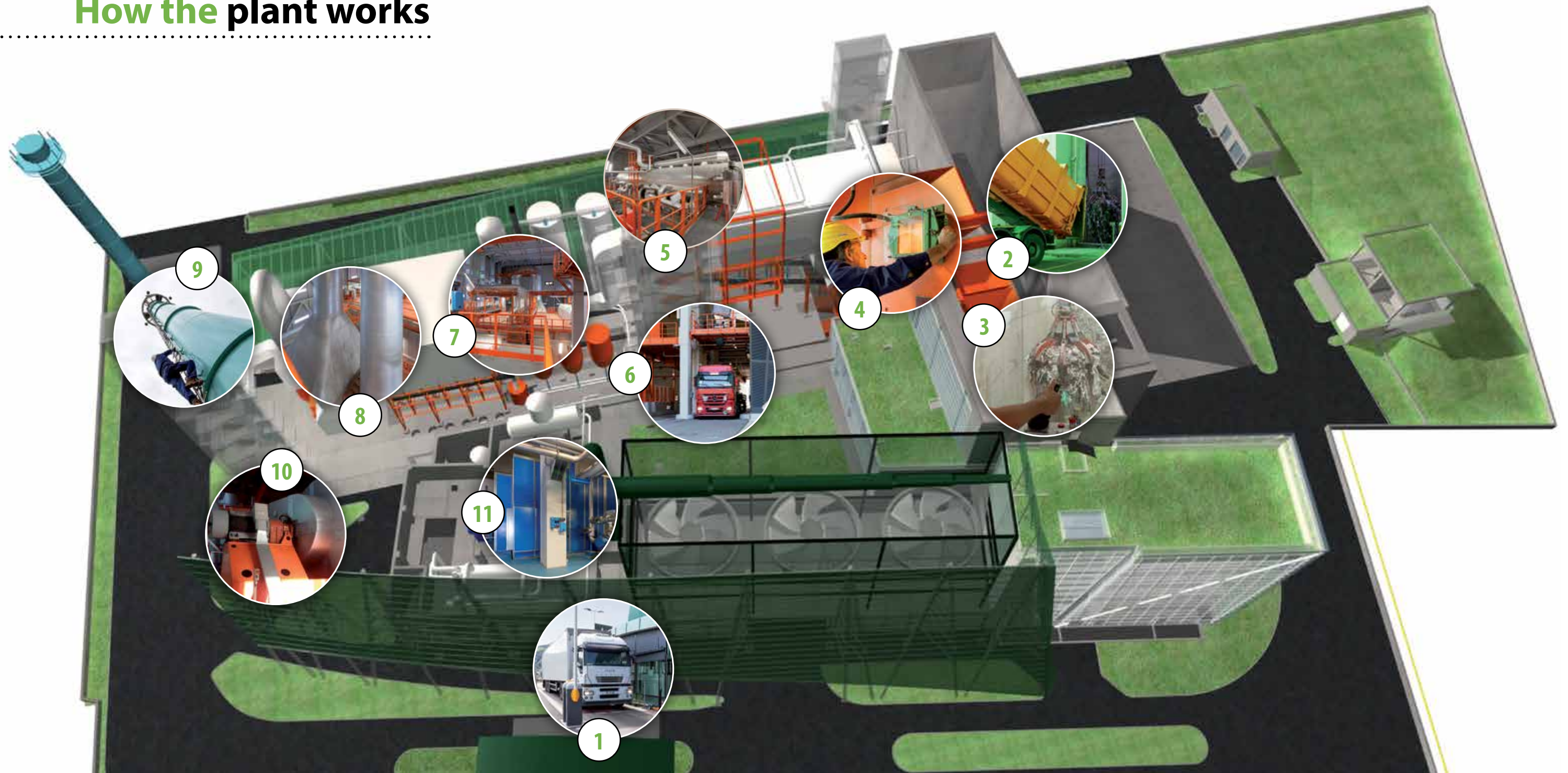
270,000 t

Urban waste per year

Waste management is defined by the "Waste management plan of the Autonomous Province of Bolzano", that sets a very precise scale of priorities: **reduction in the production of waste, favouring of waste sorting** (recycling and reuse) and **disposal of residual waste**. The waste management system includes various kinds of plants: the recycling centres collect recyclable and hazardous waste, the composting and anaerobic fermentation plants collect organic waste, and the waste-to-energy plant collects residual waste. Whatever is not part of these categories is sent to the landfill. This system allows to manage within the provincial borders 97% of the waste produced.

The residual waste of the Province of Bolzano is processed in the **waste-to-energy plant of Bolzano**, a state of the art plant in Europe that can reduce the level of pollutants well below the legal limits and that can **recover thermal and electric energy** by means of waste combustion. Due to its very high yield, it is classified as an **energy recovery facility**.

How the plant works



The waste that enters the Bolzano waste-to-energy plant is **weighed, logged (1)** and unloaded into the **bunker (2)**. Here, two **overhead cranes (3)** load it into the furnace. When the plant is inactive, the waste is packaged and stored for subsequent incineration. The **furnace (4)** consists of a combustion chamber and a grate. The **boiler (5)**, where the water is transformed into steam, is where energy is recovered from the flue gases. Combustion residue is disposed of in landfills authorised to receive non-hazardous waste. Ferrous metals are recovered and recycled. Fly ash and boiler ashes end up in two **tanks (6)**, to be sent to recovery plants.

The flue gases go through three purification stages: a double filtering stage through two fabric **bag filters (7)** and the **DeNOx catalytic reactor (8)**. The first

filter removes particulates, acids, heavy metals and dioxins; the second completes the removal of pollutants, achieving levels that are lower than the legal limits. Finally, the catalytic reactor eliminates the nitrogen oxides.

The purified flue gases reach the **stack (9)** downstream from the **ID-fan (10)**: prior to being released into the atmosphere, the emissions are continuously analysed and recorded. If the legal limits are exceeded, waste supply to the furnace is automatically stopped until the legal conditions are restored.

The steam produced by the boiler is sent to the **turbo-alternator (11)** where it is converted into electricity and then into thermal energy to be sent into the urban district heating network.

The plant processes urban waste and special waste equivalents coming from all over the Province of Bolzano (116 municipalities). It became operational in July 2013.



Project data	
Processing capacity	130,000 t/year
Thermal power of furnace	59 MW
Maximum electric power generated	15 MW
Maximum power recovered	32 MW
Surface area	25,000 m ²
Built cubic volume	197,000 m ³
Maximum height of building	48 m
Stack height	60 m
Average flue gas flow rate	110,000 Nm ³ /h

Plant operating values: www.eco-center.it.



Emission control

The Bolzano waste-to-energy plant is subject to the **Integrated Environmental Authorisation (IEA)**, that sets down the **emission limit values** of the major pollutants, the type and frequency of checks, the characteristics of treatable waste, the obligations concerning communication with the organs of supervision and transparency on behalf of the community (Internet website). The atmospheric emission limit values set by the provincial regulations for several pollutants are more restrictive than those set at a national level.

The plant has a **continuous emission monitoring (CEM)** system. The provincial supervisory organ has remote access to the plant's emission and operating database.

Daily emission values of the main parameters, the daily emission reports and the annual reports are all published online at www.eco-center.it.

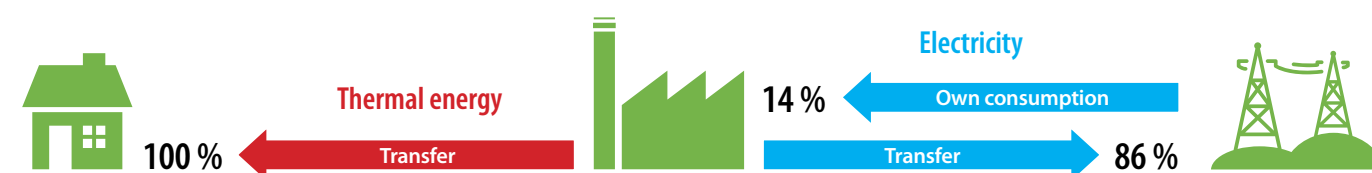
Emissions	Actual value	Defined value IEA	Legal limits
Hydrochloric acid	1 mg\Nm ³	2 mg\Nm ³	10 mg\Nm ³
Carbon monoxide	2 mg\Nm ³	50 mg\Nm ³	50 mg\Nm ³
Sulphur oxides	3 mg\Nm ³	10 mg\Nm ³	50 mg\Nm ³
Nitrogen oxides	30 mg\Nm ³	40 mg\Nm ³	200 mg\Nm ³
TOC	1 mg\Nm ³	10 mg\Nm ³	10 mg\Nm ³
Particulates	0,4 mg\Nm ³	1,5 mg\Nm ³	5 mg\Nm ³
Dioxins and furans	0,001 ng\Nm ³	0,025 ng\Nm ³	0,1 ng\Nm ³



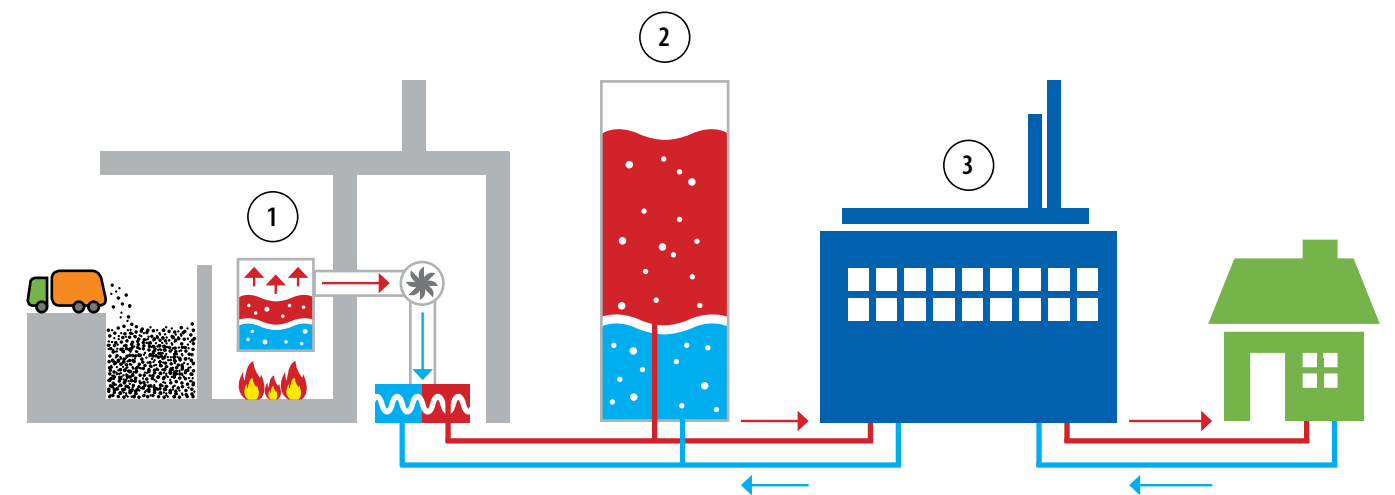
Energy recovery

The Bolzano waste-to-energy plant recovers the heat produced by burning the waste that it converts into steam, and with the steam it produces thermal energy and electricity.

Most of the electricity produced is sold to the national grid, while only a very small quantity is used for plant operation. The quota of steam that is not converted into electricity provides thermal energy to the **district heating system of the city of Bolzano**: To date (2016) 3,500 homes and 100 shops are being served by this system, and the future expansion of the network will allow to heat another 10,000 homes and many public buildings, including Bolzano's central hospital. In this way, over one third of the co-ownership heating units of Bolzano will be eliminated, **resulting in an over 20% reduction in air pollutants exhausted into the atmosphere in the Bolzano area.**



District heating



① Waste-to-energy plant

The steam generated by the combustion of waste activates a turbo alternator that produces electricity. A part of this steam, diverted from the turbine, heats the circuit that feeds the thermal accumulator and from this unit the district heating plant connected to it. Another significant quantity of heat is recovered from the combustion flue gases before they enter the stack.

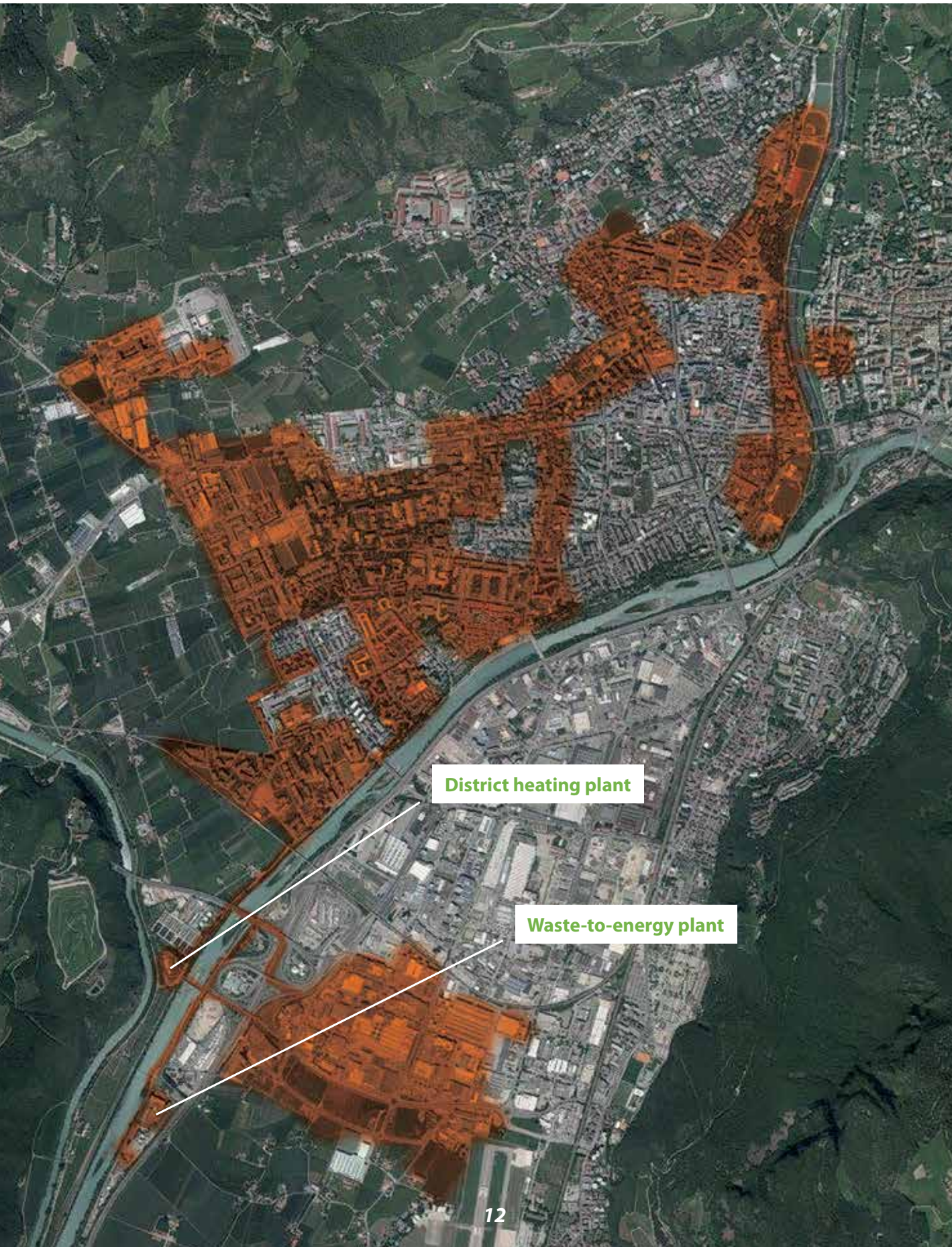
② Thermal accumulator

In low demand moments, the district heating plant stores, in the form of hot or superheated water, the thermal energy it has recovered from the waste-to-energy plant and returns this energy to the plant when demand peaks. In this way, the energy made available by processing the waste is not lost, not even for short periods of time, and is used 100%.

③ District heating plant

This is the place where the thermal energy produced by the waste-to-energy plant and partly by autonomous generators is used to produce the hot water that is then distributed via the district heating network to the final users.

The Bolzano District Heating Network (2020)



District heating plant

Waste-to-energy plant

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An 'open' system

The Bolzano waste-to-energy plant is “open” to the citizens in order to build awareness regarding the correct management of waste and to allow them to see up front how it works. Students and technicians are also invited to visit the plant for furthering their studies and research. The plant disposes of an itinerary for visitors and a conference hall that can seat up to 100 people.

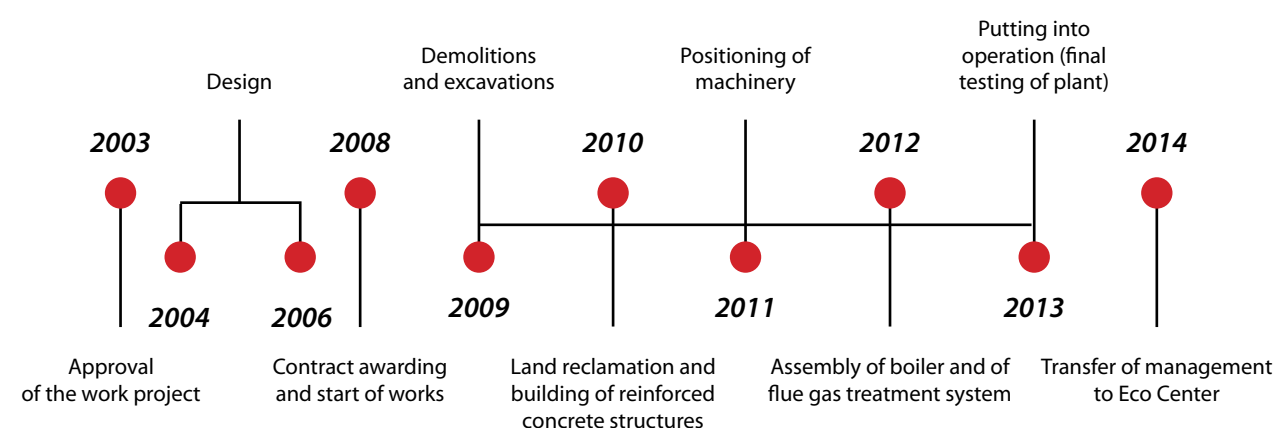
Information regarding guided tours of the plant are available at the website www.eco-center.it.



History and architecture

The Bolzano waste-to-energy plant is located at the southern entrance to the city. For those arriving in Bolzano from the motorway, it is the first structure of the city's boundaries.

The design of the building has involved the use of **shapes, materials, lines and colours that evoke the surrounding environment** and that allow it to integrate perfectly with Bolzano's environs. Special attention has been paid in designing the interiors that provide the plant's employees with a comfortable and liveable work environment, while the various departments are colour-coded in function of their use.





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