



**COMEX  
GROUP**  
TUTTO UN ALTRO CLIMA



Contributes to reducing  
the greenhouse effect



# GENIUS

ABSORPTION DIVISION

# ABOUT US ...technological innovation since 1986



## OUR MISSION

Founded in 1986 as a manufacturer of industrial ovens, the **Comex Group** has built its history on a fundamental value: technological innovation.

Many years of experience in the heating and air-conditioning sectors, combined with the continuous acquisition of know-how on new technologies and applications, enables the company to bring solutions always up-to-date with heat pump systems, solar cooling, heat recovery, thermal power stations and lately air sanitation.

Research and innovation have distinguished the company in the heating and air conditioning sector with important advantages for **Comex Group** customers in the areas of energy saving, safety and environmental protection.

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# GENIUS - transforms thermal energy into cold

The **GENIUS** division represents the absorption sector with the Comex Group Lithium Bromide Absorbers, a technology that makes it possible to use a source of thermal energy in the form of heat, to obtain cold from temperatures as low as **1°C**. The first deliveries began in 2002, and to date there are many applications in Italy and abroad.

Over the years, market demands have changed from predominantly gas-fired absorbers to thermally driven refrigeration machines (hot water, flue gas and steam) as a result of increased demand in cogeneration and use in process cycles in various sectors.

Our in-house structure, through qualified company personnel, is able to offer its customers support, aimed at the use of absorption chillers, in design, site plant engineering and technical assistance.

## Why is **GENIUS** an Energy EcoSolution?

BECAUSE IT CAN BE SUPPLIED BY ANY HEAT SOURCE



### RENEWABLE ENERGIES

1. Standard solar collectors
2. Vacuum solar collectors,
3. Solar concentrators,
4. Biomass

### TRIGENERATION

5. Microturbines
6. Cogenerators
7. Turbogas

### THERMAL RECOVERY

8. Process cycles,
9. IESI heat recovery units
10. Industrial steam

### CENTRALISED NETWORK

11. District Heating
12. Fuel gas

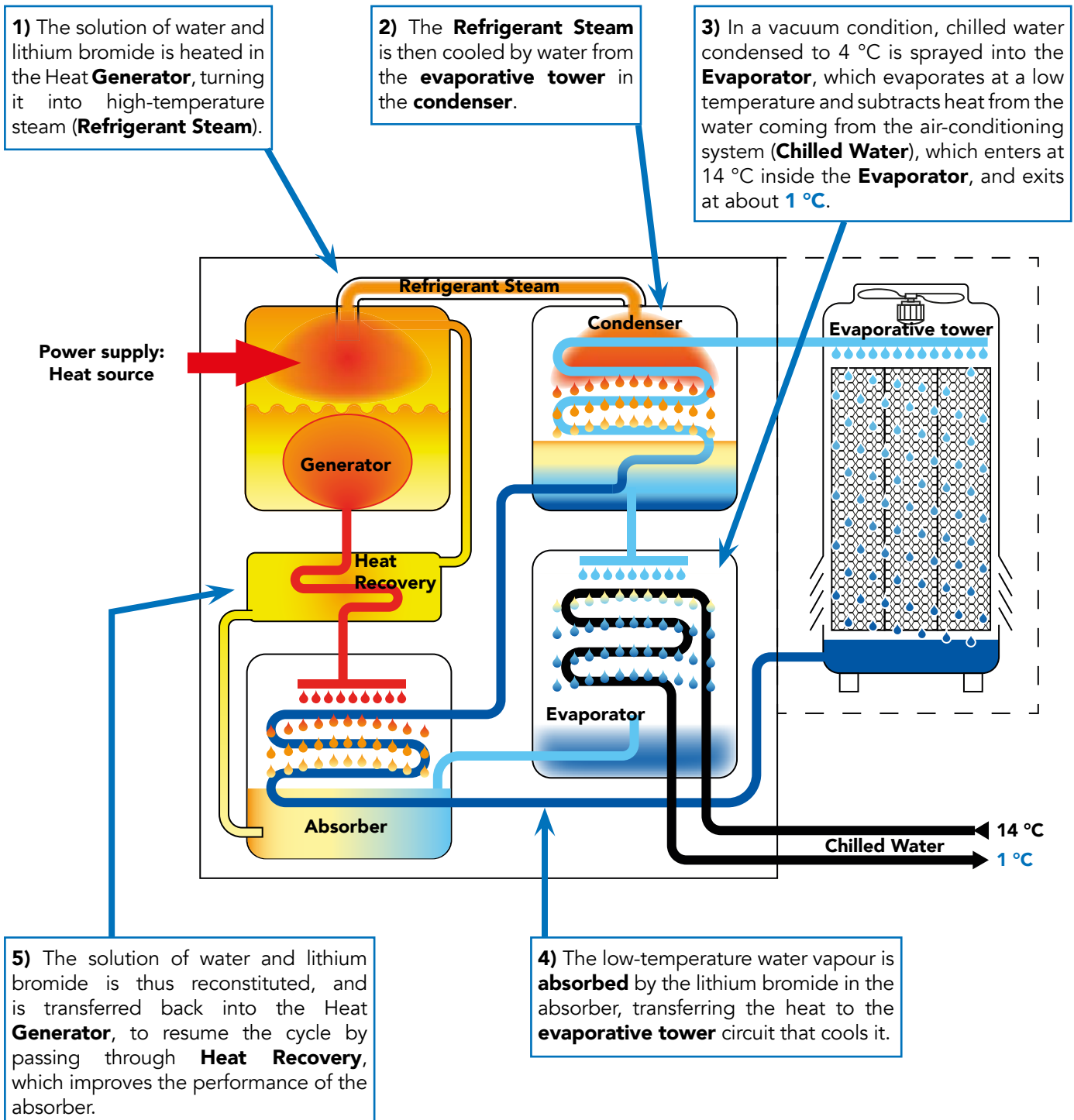
# GENIUS TECHNOLOGY - the absorption cycle

When a liquid evaporates it absorbs heat from its surroundings, for example pouring a drop of alcohol on our hand we feel a cold sensation, because as the alcohol evaporates it absorbs heat from the hand.

Under vacuum conditions, water can evaporate at a very low temperature, with a pressure of 6 mmHg, in an airtight container, water evaporates at 4°C.

The absorber uses a mixture of water and lithium bromide ( $H_2O+LiBr$ ) as the primary fluid, with the water acting as the coolant and the lithium bromide as the absorber.

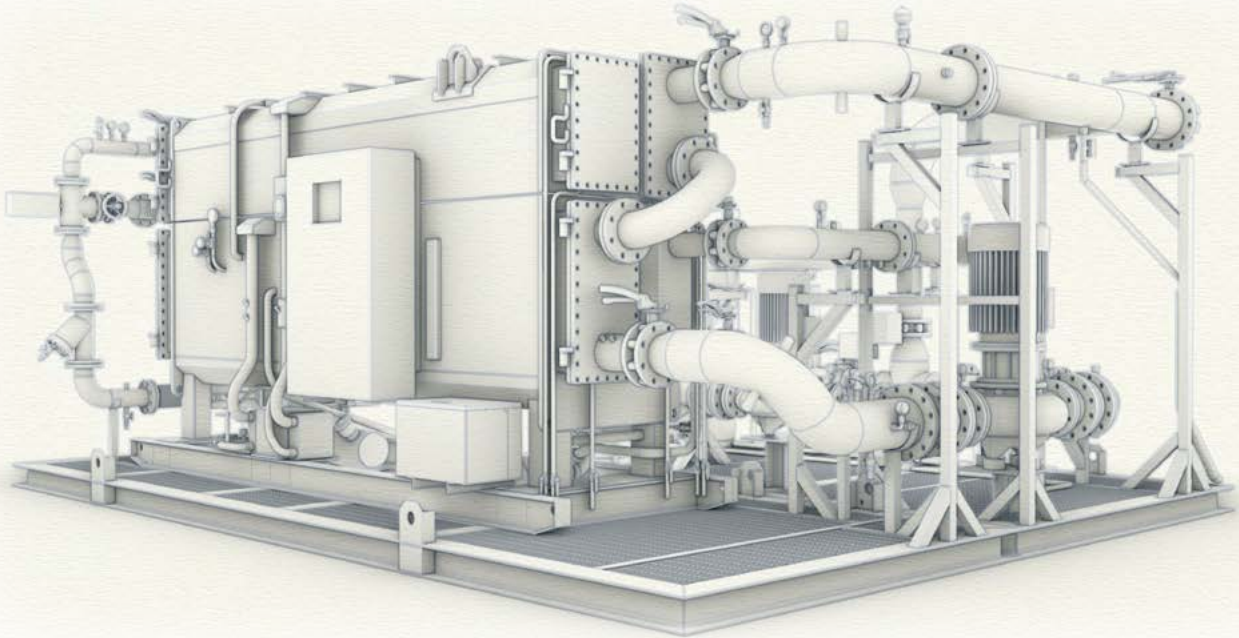
The lithium bromide solution is highly absorbent and can absorb the surrounding vapour while maintaining low pressure conditions.



# GENIUS - choosing the absorber

Absorbers are basically of two types: **single-effect** or **double-effect**, the difference between these lies in the demand for the supply parameters.

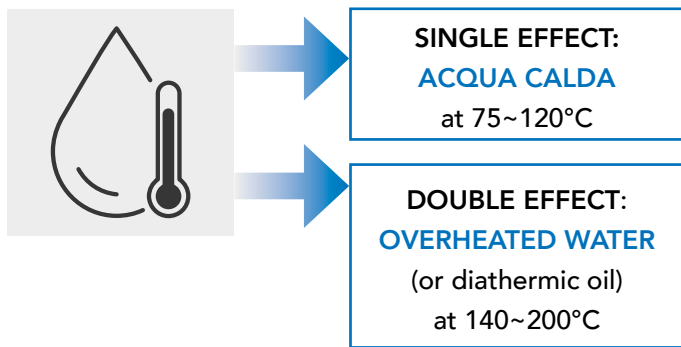
Comex Group has significant experience in this, and is able to size the system and select the absorber and all components to provide the appropriate solution to optimise efficiency for the benefit of its customers.



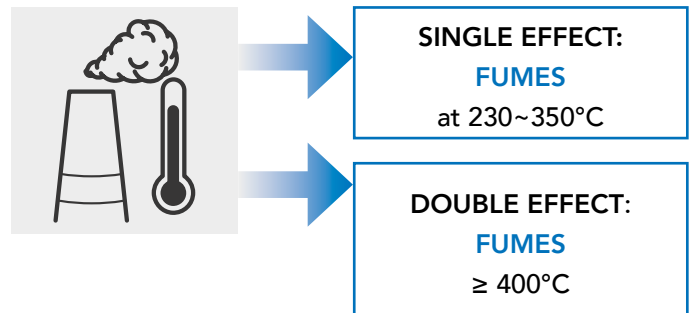
## The most suitable absorber is chosen based on the type of 'primary' heat source available

Comex Group carries out careful preliminary analyses with on-site inspections, analysing specific data on the heat sources that can be used, and providing first-class technical advice through a serious feasibility study.

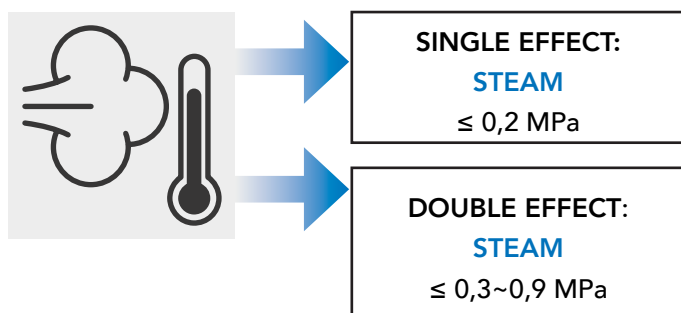
### HOT WATER 50 kW ÷ 7000 kW



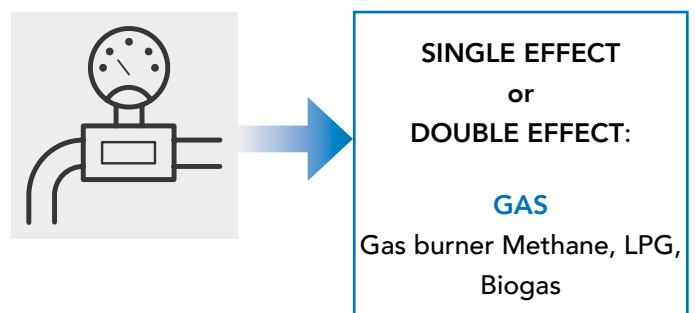
### FUMES 50 kW ÷ 7000 kW



### STEAM 200 kW ÷ 7000 kW



### GAS 200 kW ÷ 7000 kW





# GENIUS - from design to installation

## ADVANTAGES

- **Comex Group is a reliable partner able to offer its thirty years of experience** to share with the design studio the best technical solution for the user.
- **Customised supply of a monobloc absorption central unit**, for use inside or outside the premises, complete with hydronic, electrical and water treatment system and, if required, also the connection of the evaporative tower positioned on the roof of the cabinet.
- **Having a single supplier who is responsible for the production quality of the supply, the efficiency of the absorber up to the total maintenance of the system** designed in accordance with the design office according to the customer's needs.
- **The availability of on-site support by a qualified company technician** from the preliminary design phase to delivery.
- **The guarantee of long-lasting durability of the absorption refrigeration unit** and related equipment with maintenance of the initial design performance.



## THE SOLUTION

- **Ad hoc sizing of the absorption refrigeration unit** based on the user's requirements and/or the thermal power of the supply source
- **Ad hoc positioning of the hydraulic connection flanges based on the layout of the heating plant.**
- **Availability of supply of the individual GENIUS absorption cooling unit or central absorption unit (Skid or Package version).**
- **Testing of the absorption unit at the factory.**
- **Start-up and performance certification.**

### SKID



Plant for indoor installation

### PACKAGE



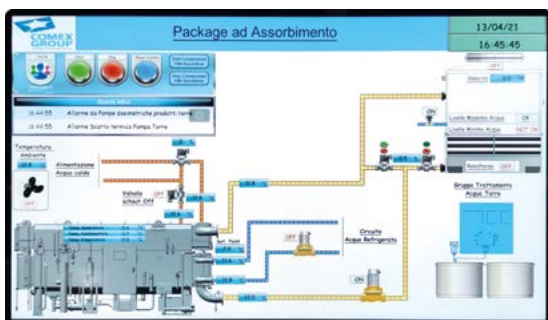
Plant for outdoor installation

# GENIUS INDUSTRY 4.0 - technology, safety, convenience COMEX GROUP

## DESIGN IN ACCORDANCE WITH THE "INDUSTRY 4.0" WITH REMOTE MANAGEMENT

Thanks to modern technology, Comex Group offers a service and monitoring service that allows the installed systems to be monitored. In addition to this, it also offers scheduled maintenance in order to guarantee its customers safety and reliability of the systems.

**All of this is consistent with the INDUSTRY 4.0 design model, which allows you to take advantage of the economic benefits where provided by specific regulations or tax breaks.**



## CHOOSING TO REUSE ENERGY IS TO RESPECT THE ENVIRONMENT



Contributes to reducing the greenhouse effect



# GENIUS + IESI - a winning combination of ecology and plant engineering

## IESI: THE ENERGY RECUPERATOR



IESI is a patented product that is part of the Comex Group's Green philosophy of heat recovery and the transformation of energy from dissipated to renewable energy.

It is a recuperator of thermal energy derived from cooling fluids, superheated air or flue gases that are expelled into a free atmosphere through chimneys or smoke ducts.

It can be supplied in a skid version for installation in central heating plants or in a package version for installation outside rooms.

**IESI is a product that can fall within the scope of tax incentives when provided for in the regulations in force in the country of installation, and in line with the "Industry 4.0" model**

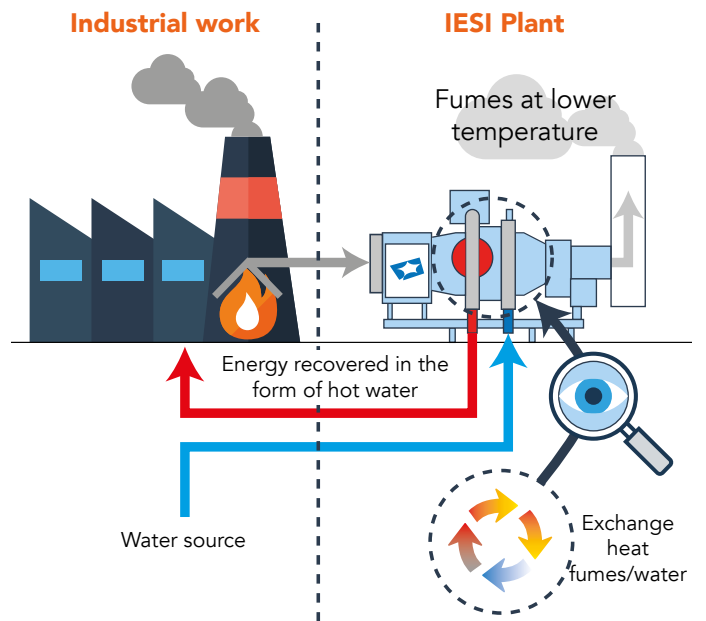
## HOW DOES IESI WORK?

IESI recovers thermal energy when the heat of the source flue gas passes through it, which, as it hits the exchangers, transmits part of the available heat to the water at temperatures of up to 110°C.

The recovery of thermal energy can be up to 90% and more compared to the source, the efficiency of the system is also a function of the system, and its design for heat reuse.

By recovering the sensible heat contained in the flue gases, and the latent heat (when condensing), an overall system efficiency of up to 107% can be achieved.

This performance allows access to tax concessions according to the rules and regulations in force.



## THERMAL ENERGY RECOVERED FROM IESI CAN SUPPLY GENIUS





# GENIUS - success stories

## THE PLANT BECOMES TRIGENERATION THANKS TO GENIUS

In cooperation with ENERBLU COGENERATION

Thanks to synergy and a dedicated design study, it was possible to create the best technical solution for the user: **TRIGENERATION**.

Thermal energy is recovered and reused to generate cold water at 7°C for air conditioning.

**ECOSOLUTIONS COMEX GROUP**

**OUTPUT POWER 200kW  
IN COLD**



## THE ECOLOGICAL COLD THANKS TO GENIUS

Comex Group realises this GENIUS plant powered by steam produced by a cogeneration turbine in a paper industry in Lucca, as always the dedicated design study was instrumental in realising the best technical solution for the user.

**COMEX GROUP REUSES THE STEAM FROM THE TURBINE AND CONVERTS IT INTO ENVIRONMENTALLY FRIENDLY CHILLED WATER**





# GENIUS - success stories

## A WORLDWIDE BRAND HAS CHOSEN THE GENIUS ABSORPTION PLANT

Comex Group realised this GENIUS plant in a cutting-edge technological industrial context. A world-famous brand for its plant in Piedmont chose COMEX GROUP for the design, supply, installation and start-up of this GENIUS plant. COMEX GROUP realised the best turnkey technical-plant solution for this important customer.

### COMEX GROUP SOLUTIONS: FROM GAS TO COLD

**OUTPUT POWER 600kW IN COLD**



## ECOLOGICAL ABSORPTION PLANT GENIUS: COLD IN TRIGENERATION

Installation of the package Genius hot water-fired power plant at the metalworking industry in Mondovì: Package Genius enables **TRIGENERATION** by interfacing with the cogenerator, the cooling water is fed into the absorption plant.

### COMEX GROUP REUSES THE HOT WATER FROM THE COGENERATOR AND CONVERTS IT INTO ENVIRONMENTALLY FRIENDLY CHILLED WATER

**OUTPUT POWER 600kW IN COLD**





**ECOLOGICAL ABSORPTION PLANT GENIUS: COLD IN TRIGENERATION**

This installation solution with a superimposed evaporative tower was carried out in Emilia Romagna under special conditions of limited space. The Genius absorption power plant in package is fed with hot water from a cogenerator.

**COMEX GROUP REUSES THE HOT WATER FROM THE COGENERATOR AND CONVERTS IT INTO ENVIRONMENTALLY FRIENDLY CHILLED WATER**



**OUTPUT POWER 280kW IN COLD**

**TURBOGAS PLANT POWERS GENIUS ABSORBER IN 1MW SKID VERSION**

The installation of the Genius power plant in SKID version at a paper industry in Catania is fed by the **TURBOGAS** plant generating **1MW of cold in trigeneration.**

**ECOSOLUTIONS COMEX GROUP: FROM TURBOGAS TO COLD**



**OUTPUT POWER 1MW IN COLD**



# GENIUS - success stories

## ECOLOGICAL GENIUS ABSORPTION PLANT AT THE UNIVERSITY OF VENICE IUAV

The University of Venice IUAV has also chosen **COMEX GROUP** solutions, because culture also needs the right climate during study and learning. This roof-mounted package installation solution with a separate evaporative tower is only visible from above so as to preserve the charm of this unique city by the sea. The Genius absorption packaged plant is powered by hot water from a co-generator.

**COMEX GROUP** contributes to creating the right climate for teaching and learning in an **ECOLOGICAL** way, **ALLOWING TRIGENERATION THANKS TO GENIUS PLANT**



Photo taken from Google Maps



# GENIUS - success stories

## ECOLOGICAL SOLAR COOLING ABSORPTION PLANT GENIUS

**COMEX GROUP**, realised this ecological **SOLAR COOLING** plant for the headquarters of the Banca di Credito Cooperativo. A roof-mounted package plant solution with a separate evaporative tower and high-efficiency condensing backup boilers.

The condensing boilers only intervene automatically when the hot water from the solar panels is not sufficient to supply the Genius absorption system.

In this way COMEX GROUP always guarantees both the production of cooling through the GENIUS absorption system and the production of hot water for heating and sanitary purposes even in the winter months.

### COMEX GROUP REALISES A SOLAR COOLING SOLUTION:

- **EFFICIENT**
- **FLEXIBLE**
- **ECONOMIC**
- **ECOLOGICAL**





# GENIUS - success stories

## GENIUS ECOLOGICAL ABSORPTION PLANT AT CINECA IN BOLOGNA

CINECA is an Italian non-profit inter-university consortium, whose members include 69 Italian universities, 2 ministries and 27 national public institutions.

A **GENIUS** installation solution in a monoblock package supplied with hot water, and 2 high-efficiency condensing boilers.

### COMEX GROUP ALLOWS MULTIPLE SOLUTIONS



Photo taken from Google Maps



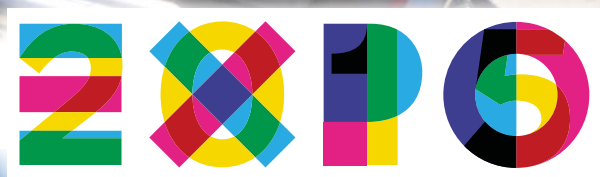
# GENIUS - success stories

## ECOLOGICAL SOLAR COOLING ABSORPTION PLANT GENIUS AT EXPO MILANO 2015

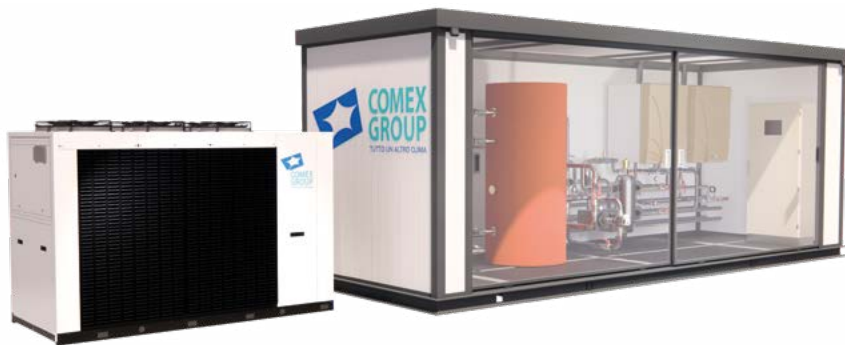
COMEX GROUP, is proud to have realised this ecological SOLAR COOLING plant, on the occasion of the EXPO 2015.

The Genius absorption hot water plant is powered by solar concentrators.

COMEX GROUP REALISES AN ENVIRONMENTALLY FRIENDLY SOLAR COOLING SOLUTION AT EXPO MILANO 2015



## HYBRID SYSTEMS



## INDUSTRIAL OVENS



## HEAT RECOVERY



## ADIABATIC COOLERS



## SPLIT SYSTEMS



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